EDISON
Electric Institute
BULLETIN

APRIL, 1935

STATISTICAL DATA OF THE ELECTRIC LIGHT AND POWER INDUSTRY

Compiled Monthly by the Edison Electric Institute—Covers 100% of the Industry

DURING THE MONTH OF JANUARY

	1935	1934	%
Kilowatt-hours Generated* (net)			
By Fuel	4,700,752,000	4,340,916,000	+ 8.3
By Water Power	3,024,139,000	2,706,247,000	+11.7
Total Kilowatt-hours Generated	7,724,891,000	7,047,163,000	+ 9.6
Additions to Supply			
Energy Purchased from Other Sources	141,109,000	197,037,000	−28.4
Net International Imports	79,264,000	69,120,000	+14.7
Total	220,373,000	266,157,000	−17.2
Deductions from Supply			
Energy used in Electric Railway Departments	61,227,000	66,273,000	− 7.6
Energy used in Electric and Other Departments	121,524,000	115,889,000	+ 4.9
Total	182,751,000	182,162,000	+ 0.3
Total Energy for Distribution	**7,762,513,000**	**7,131,158,000**	**+ 8.9**
Energy Lost in Transmission, Distribution, Etc.	**1,293,782,000**	**1,220,349,000**	**+ 6.0**
Kilowatt-hours Sold to Ultimate Consumers	**6,468,731,000**	**5,910,809,000**	**+ 9.4**
Sales to Ultimate Consumers (kw-hrs)			
Domestic Service	1,316,743,000	1,243,962,000	+ 5.9
Commercial—Small Light and Power (Retail)	1,245,351,000	1,162,345,000	+ 7.1
Commercial—Large Light and Power (Wholesale)	3,135,330,000	2,748,258,000	+14.1
Municipal Street Lighting	222,089,000	222,070,000	+ 0.0
Railroads—Street and Interurban	431,009,000	396,054,000	+ 8.8
Railroads—Electrified Steam	67,009,000	61,517,000	+ 8.9
Municipal and Miscellaneous	51,200,000	76,603,000	−33.2
Total Sales to Ultimate Consumers	6,468,731,000	5,910,809,000	+ 9.4
Total Revenue from Ultimate Consumers	$170,101,000	$162,070,400	+ 5.0

DURING TWELVE MONTHS ENDING JANUARY 31st

Kilowatt-hours Generated* (net)			
By Fuel	53,650,934,000	48,051,338,000	+11.7
By Water Power	31,558,947,000	31,536,558,000	+ 0.1
Total Kilowatt-hours Generated	85,209,881,000	79,587,896,000	+ 7.1
Purchased Energy (net)	2,999,319,000	2,975,240,000	+ 0.8
Energy Used in Electric Railway and Other Departments	2,013,721,000	1,903,374,000	+ 5.8
Total Energy for Distribution	86,195,479,000	80,659,762,000	+ 6.9
Energy Lost in Transmission, Distribution, etc.	**14,855,777,000**	**14,367,911,000**	**+ 3.4**
Kilowatt-hours Sold to Ultimate Consumers	**71,339,702,000**	**66,291,851,000**	**+ 7.6**
Total Revenue from Ultimate Consumers	$1,845,076,600	$1,775,206,700	+ 3.9
Important Factors			
Per cent of Energy Generated by Waterpower	37.0%	39.7%	
Average Pounds of Coal per Kilowatt-hour	1.44#	1.45#	
Domestic Service (Residential Use)			
Average Annual Consumption per Customer (kw-hr)	634	605	+ 4.8
Average Revenue per kw-hr (cents)	5.28¢	5.48¢	− 3.6
Average Monthly Bill per Domestic Customer	$2.79	$2.76	+ 1.1

BASIC INFORMATION AS OF JANUARY 31st

Generating Capacity (kw)—Steam	23,802,800	24,041,800	
—Water Power	8,947,500	9,005,300	
—Internal Combustion	500,900	452,600	
Total Generating Capacity in Kilowatts	33,251,200	33,499,700	
Number of Customers			
Farms in Eastern Area (Included with Domestic)	(533,997)	(505,545)	
Farms in Western Area (Included with Commercial—Large)	(208,226)	(204,997)	
Domestic Service	20,487,399	20,025,830	
Commercial—Small Light and Power	3,745,109	3,690,462	
Commercial—Large Light and Power	503,310	523,893	
All Other Ultimate Consumers	71,923	66,929	
Total Ultimate Consumers	24,807,741	24,307,114	

* By courtesy of the U. S. Geological Survey with deductions for certain plants not considered Electric Light and Power Enterprises.

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EDISON ELECTRIC INSTITUTE BULLETIN

Volume III APRIL, 1935 No. 4

Institute's Convention Again to Be Held at Atlantic City

Vital Program to Make Convention Most Important of Recent Years

IN view of the expressed wishes of the members of the Institute, the Board of Trustees has decided that the Third Annual Convention of the Institute should be held at Atlantic City, N. J., instead of at Washington, D. C., as had been previously announced. Arrangements are accordingly being made to hold the Convention at the Hotel Traymore, Atlantic City, N. J., during the period June 3 to 6. Last year's Convention was also held at the Traymore.

Five general sessions loaded with subjects of vital interest to the electric light and power industry promise to make the 1935 Convention the most important gathering of members of the industry in recent years.

Starting at 10 o'clock, Monday morning, with a session at which such matters as the rate situation nationally, the practical experience of different companies with the various types of promotional rates, just how the rates were made, subsidized electric plants, and rural electrification will be discussed by authorities in these fields, the Convention will continue with general sessions on Monday afternoon, Tuesday morning, Wednesday morning and Wednesday evening, carrying a program of absorbing interest.

The findings of the Federal Trade Commission in its utilities investigation and the building of good-will by utility companies will be discussed. Standards of service demanded by the public and the regulatory authorities as contrasted with more primitive construction and the lower-grade service proposed by some public authorities agitating for public ownership, plant modernization as a cheap means of increasing generating capacity, the presentation of two company sales programs, the utilities' interest in the Better Housing Program of the Federal Government, the electric kitchen as a load builder, new business horizons through vapor illuminants, government invasion into the fields of private industry, and other subjects of like importance are among the matters to be discussed by leading executives of the industry.

Several nationally recognized leaders in other fields will also be invited to speak during the convention on matters of present concern to the utilities. Reports and addresses setting forth the affairs of the Institute and of the industry will be made by President McCarter and other officers.

Special meetings of several of the technical committees will be held Tuesday afternoon, the Operating Committee will meet Wednesday noon and the Board of Trustees Wednesday afternoon. Except for the committee and board meetings, all of the sessions will be open to those wishing to attend. It is desired by President McCarter and the Institute's officers that member company executives send as large a delegation from their respective organizations as circumstances will permit.

The complete program for the Convention will be published in the May issue of the BULLETIN.

The registration booth in the Hotel Traymore will open Sunday afternoon, June 2 at 2:30 o'clock, and on the following Monday, Tuesday and Wednesday mornings at 9 o'clock. Since two of the sessions will be held on Monday, it will be advantageous to arrive in Atlantic City by Sunday, or on early trains Monday morning, at latest.

All of the meetings will be held in the Hotel Traymore, one of the country's finest hotels, with which many of those who will attend the Convention are familiar. Reservation cards for Washington hotels were mailed to member-company executives prior to the decision to change the location of the Convention. These should be disregarded. In case reservations have already been made, it is suggested that the Washington reservations be cancelled.

On the next page of this issue is a list of Atlantic City hotels and their rates, as well as other information relating to hotel accommodations and the securing of reservations. Atlantic City hotel reservation blanks will be mailed shortly to member companies.

Arrangements are being made with the railroads to provide reduced round-trip rates to the Convention. These rates will be operative from all points in the United States. Identification certificates will be mailed to all member companies early in May. In the event that certificates have not been received by the middle of May, or more are desired, others will be available from the general offices of the Institute.

Other than provisions for dancing in the hotel each evening to the music of an excellent orchestra, and a card party for the lady guests on Monday afternoon at the Seaview Golf Club, no entertainment has been planned, since the resort city offers many diversions to occupy what little leisure delegates to the Convention may have.

ATLANTIC CITY HOTELS

Rates Quoted are for the 1935 Edison Electric Institute Convention —Reservation blanks to secure accommodations during the convention will be mailed to member companies.

This list of hotels, prepared by the Atlantic City Convention and Publicity Bureau, shows the accommodations and prices of hotels located on the Boardwalk and on intersecting avenues.

Delegates and guests to the convention should make applications for reservations to the hotel of their own choice. It is desirable that applications be made promptly in order to secure reservation at hotel of first choice. Hotels will acknowledge reservations direct to the persons applying for them.

The date and hour of arrival should be given when applying for reservations. The date of departure should also be given, thus releasing accommodations for late arrivals.

Hotels cannot hold reservations made by members and guests who fail to register before 6 p.m. on the day for which they have been reserved, unless the time of arrival is clearly indicated and rooms paid for in event that they are not used. Buses of Atlantic City hotels meet all incoming trains.

BOARDWALK HOTELS

EUROPEAN PLAN—RATES BY THE DAY

Hotel	No. of Rooms	ROOM—ONE PERSON		ROOM—TWO PERSONS	
		With Bath.	Without Bath	With Bath.	Without Bath
*Chalfonte-Haddon Hall	1000	$3.00–$6.00	.....	$5.00–$10.00	.....
*Ambassador	650	4.00– 6.00	.....	6.00– 8.00	.....
*Traymore	600	4.00–12.00	$3.00	6.00– 14.00	$4.00
*Marlborough-Blenheim	469	4.00– 9.00	3.00–$5.00	6.00– 12.00	5.00–$7.00
*Dennis	450	4.00– 7.00	3.50– 6.00	6.00– 17.00	5.00– 8.00
Ritz-Carlton	425	4.00– 6.00	.....	6.00– 8.00	.....
Claridge	400	4.00– 7.00	.....	6.00– 9.00	.....
Shelburne	300	3.00– 8.00	.....	5.00– 10.00	.....
*Brighton	290	3.00– 6.00	.....	5.00– 9.00	.....
*Knickerbocker	285	3.00– 6.00	.....	5.00– 8.00	.....
*Chelsea	225	3.00– 5.00	2.50	6.00– 9.00	5.00
New Belmont	100	2.50– 3.50	2.00– 2.50	4.00– 8.00	3.00– 5.00

AVENUE HOTELS

EUROPEAN PLAN—RATES BY THE DAY

Hotel	No. of Rooms	ROOM—ONE PERSON		ROOM—TWO PERSONS	
		With Bath.	Without Bath	With Bath.	Without Bath
*Morton	300	$2.50–$5.00	$2.00–$2.50	$5.00–$8.00	$4.00–$5.00
*Colton Manor	208	3.00– 6.00	2.50	5.00– 9.00	4.00
*Ludy	200	3.00– 5.00	2.50– 3.00	5.00– 8.00	4.50– 6.00
*Madison	200	3.50– 5.00	3.00– 4.00	6.00– 8.00	5.00– 6.00
Crillon	100	.....	.....	5.00	3.00
*Jefferson	150	3.00– 4.00	2.50– 3.00	5.00– 7.00	4.00– 5.00
Penn-Atlantic	125	3.00– 3.50	2.00– 2.50	4.00– 5.00	3.00– 4.00
Kentucky	110	2.00– 2.50	1.25	3.00– 4.00	2.50
*Glaslyn-Chatham	102	3.50	2.50	5.00	3.50– 4.50
*Arlington	100	2.50– 3.00	1.50– 2.00	4.00– 5.00	3.00– 3.50
*Lafayette	100	3.00– 4.00	2.00– 3.00	4.50– 6.00	4.00– 5.00
*Monticello	100	.....	1.50– 2.50	5.00– 6.00	3.00– 4.00
Franklin Inn	90	2.00– 4.00	1.50– 2.00	3.00– 5.00	2.50– 3.00
*Grossman's	85	AMERICAN PLAN	RATES ONLY	ON APPLICATION	
Richfield	73	2.50– 3.50	.....	4.00– 6.00	.....
Mt. Vernon	55	2.50– 3.00	1.25– 2.00	3.00– 5.00	2.00– 3.00
Louvan	32	.....	1.00– 2.00	5.00	2.00– 3.00
*St. James	25	.....	1.50– 2.00	.....	2.00– 4.00

Hotels marked * are also on the American Plan, where meals will be included at an additional charge of $2.50 per day per person, if desired.

More Harm Than Good to Both Consumers and Investors

Statement before the Committee on Interstate and Foreign Commerce, House of Representatives, March 27, 1935, in the course of the hearings on the Rayburn Bill (HR 5423)

By Samuel Ferguson

Chairman, The Hartford Electric Light Company

MY qualification to testify intelligently on this bill and the abuses it is designed to remove has I think been vouched for by Commissioner Splawn when he cited the company of which I have been president for many years as having succeeded in keeping itself wholly free from such abuses.

The fact that I have no prejudice in favor of holding companies is obvious from the testimony of Mr. Healy when he read into the record an extract from my address as president of the Edison Association nine years ago, wherein I warned the industry of what was bound to happen in case the abuses then evident should continue and increase.

Purpose of Appearance

On Feb. 22, 1935, I wired a member of your committee that I desired to be recorded as firmly believing that this bill, if it became a law, would do far more harm than good to both investors and consumers, and my appearance here today is to explain the reasons for this opinion and to make practical suggestions as to methods of correcting the abuses without harming the public.

My reason for actively opposing—during the past fifteen years—the desires of various holding companies to acquire the Hartford Electric Light Company was my belief that such opposition was in the best interest of the stockholders. It was apparent from an analysis of the various mergers of operating companies into holding company organizations that a very large percentage of the holders of the operating company stocks were induced either to exchange their stocks for that of the holding company or to invest in the same a large part of the cash which they received. This came about by reason of the high market quotation generally existing for such stocks which made the investment seem to be desirable, when according to my belief the intrinsic value was far below the value of the operating company stocks which they gave up. Recently I have received many letters from stockholders thanking me for pursuing this policy and stating that the reason they were writing was because of the erroneous opinion that they had previously entertained, during the speculative boom years, that the policy was depriving them of profits such as other stockholders had seemed to be obtaining by following the then prevailing line of thought.

Benefits to Consumers

While during these years I was protecting our stockholders, I was very conscious that the policy pursued, unless modified, would be a distinct harm to our customers in depriving them of the benefits that accrued to the customers of holding company subsidiaries. These benefits that customers have received from the holding company development are very real and as a whole far exceed such items of abuse as admittedly have existed in some cases (such as excessive management charges, failure to credit subsidiaries with savings derived from consolidated income tax returns, etc.). The reason that great benefits have accrued to customers need not be attributed to altruism on the part of the managements—though many believed in and operated on the principle of an equitable sharing of the operating economies effected—but was because such policy was an absolute essential if the market for their securities was to be maintained. Holding company securities in the speculative years were never sold on the basis of present or immediately prospective earnings (these were hardly mentioned in prospectuses), they were sold on the basis of capitalizing the future of the nation when electricity should be more universally used; and to hold the interest of investors it was growth and not earnings which had to be shown annually. And to show growth two things were necessary, namely—(1) great effort to develop and promote new uses, and (2) a constant lowering of rates; from both of these policies the consumers gained.

Only Investors Hurt

In other words it is the investing public and not the consuming public which so far has been hurt. Mr. Healy has also testified to the effect that it is the investors rather than the consumers which have been the most hurt. Legislation cannot undo the harm previously done to the investing public but should prevent further harm to either the consuming or investing public and should not in itself hurt either.

State Regulation

Striking evidence, and evidence which cannot be controverted, that state regulation of the subsidiaries of even the holding companies in worst repute can and has been effective in saving the consuming public harmless, is given in the recent Federal Power Commission report as to rates. I call your attention to the comparison of rates as given on chart four of that report (commented upon by Mr. Dozier DeVane—Page 507). Eighteen cities out of one hundred and seven are listed as having prices 5 per cent or more below those of Hartford. Seventeen of these cases cause me no embarrassment because as Commission Splawn testified (Page 188), local conditions such as low fuel cost or high percentage of water power are a sufficient explanation, but there remains one company which without these natural advantages is 15 per cent lower than Hartford. This is distinctly embarrassing, but the interesting fact is that this particular company in Cambridge, Mass., is a subsidiary of the Associated Gas & Electric Company against which a large part of the proponents' testimony has been directed.

Action Taken Here

Because, by reason of the policy I pursued, our customers were deprived of very great advantages which would undoubtedly have accrued to them had

I assented to become a subsidiary of such an organization as Stone & Webster, I felt it was incumbent on me to obtain for them as nearly as might be the equivalent operating savings. This was partially but not wholly accomplished through (1) working out a method of power exchange with other companies in which there was no common financial interest; through (2) a management contract executed on behalf of one of our affiliated companies with Stone & Webster on the same terms as they gave to their own subsidiaries; through (3) construction contracts with the same holding company whereby hundreds of thousands of dollars were saved in spite of the percentage paid; through (4) the consolidation of affiliated company purchases exactly as a holding company would do; and in general (5) following such beneficial practices as are the ample justification for the existence of the holding company type of organization. In other words, I saw no reason for not making good use of a pocket knife just because sometimes it cuts your finger. Pocket knives are kept away from children because the chances are that cut fingers would be more prevalent than good uses, but for those capable of making good use of pocket knives, it is only the intentional misuse which is prohibited in society as at present constituted.

All of our local affiliated operating companies fall under the proposed ban of holding companies. I would be very sorry to be forced into a consolidation of these properties into a single operating company even if it were possible since by maintaining a responsible local directorate and management in the various companies the antagonism of the public toward an absentee landlord is avoided. This is of far greater importance than is generally recognized and is wholly lost if local companies are merged into one great operating company.

Scope of Bill

The statement of Mr. Bulwinkle that "under no circumstances, if this bill should pass would the Hartford company have to be bothered" shows how little the scope of this bill is comprehended. This bill would completely upset the policies and methods of doing business of the Hartford company, which company is vitally affected by the provisions of both Title I and Title II.

I would be the first to admit many cases of flagrant misuse of the holding company setup, and the need for proper regulatory control, but having been on the inside for many years I believe my conclusions as to the results of this bill are entitled to careful consideration. I can state with positiveness that its passage will result in:

1—For those investors who already have lost heavily in the Holding Company equities acquired either by purchase or exchange of operating company stocks the result will be the loss of what little they have left.

2—For investors in bonds of operating companies, such as trusts and insurance companies, a heavy loss through the decrease in market value caused by forced liquidation of Holding Company portfolios.

3—For the customer—no gain not readily obtainable through reasonable regulation and a material slowing up in the lowering of costs and improvement and extension of service which have been so very marked during the past fifteen years.

In the case of the Connecticut Power Company, a distribution of the stocks held is impossible without complete liquidation as same are subject to the existing mortgages, one of which covers an issue of bonds which are not callable. Such procedure would require a forced sale of securities where no market will exist.

Suggestions

In view of the above, I submit the following suggestions for your consideration:

First of all—revise the definition of Holding Company to eliminate the multitude of operating companies now included. There are very few operating companies but which have, for one reason or another, small subsidiaries similar to this chart covering our affiliated companies, and this section of the bill should not be concerned with such. The following definition is sufficiently comprehensive to cover every case against which this bill is aimed.

H. R. 5423—Section 2—Part 7—Amended Definition:

"Holding Company" means (A) any company deriving 50 per cent of its revenue either directly or indirectly from one or more public utility companies which it controls whether such control is exercised through one or more intermediary persons or by any means or device whatsoever; (B) any intermediary company through which such control is exercised; and (C) any person or persons which the Commission determines, after notice and opportunity for hearing, to exercise such a material influence over the management or policies of any public-utility or holding company as to make it necessary or appropriate in the public interest or for the protection of investors or consumers that such person or persons should be deemed a holding company or companies for the purposes of this title.

Secondly, incorporate in the bill the following regulatory provisions in place of announced purpose to force a general dissolution which is both impracticable and does great damage to security values. These provisions cover fully all recommendations of the report of the Federal Power Policy Commission recently sent to Congress by the President.

Recommendations

1—Registration of holding companies as above defined.

2—Regulatory authority over registered companies as to:

(a) Issuance of securities.

(b) Accounting methods and book entries.

(c) Reports, including certain items which must be covered in annual reports.

(d) Mergers and acquisitions or sales of companies or properties.

3—"Holding Company" rather than "company" to become a part of corporate name.

4—Prohibition of upstream loans.

5—Prohibition of any profit from services rendered to or between wholly-owned subsidiaries. Limited profit on controlled subsidiaries not wholly-owned.

6—Prohibition of sale of holding company securities by employees of operating companies.

7—A tax on the amount of dividends which have passed through more than one intermediary holding company, between the operating company, first paying same and the receiving holding company except where the Commission has certified that the dissolution of such intermediary companies is not in the public interest.

Title II—H. R. 5423

This title has been stated by witnesses to control only such electric energy as is now outside the scope of state regulation by reason of its passage over state lines; and further purports not to encroach on the existing powers of the several states in the regulation of their public utilities.

This is far from the case because in the event that a company sends any power whatever across state lines, no matter how small a percentage, there passes from state to Federal control, not only with regard to the one company but with regard to other companies connected to its system, the following powers:

1—Section 201—Jurisdiction over the operation of power houses and transmission lines even though the per cent of interstate power is insignificant. Under this section the state loses control of quality of service.

2—Section 202(a)—Makes all lines common carriers subject to Federal control.

3—Sections 202, 207, 208, 209—As originally drafted—jurisdiction over all rates; but this I believe is broader than intended and has been modified by amendment.

4—Section 203a—The use of the natural resources of one state for the benefit of another.

5—Section 203b—The power to limit unnecessary or uneconomical expansion in capacity of power houses and transmission lines. *(Continued on page 111)*

The Operating Companies and Title II of the Rayburn Bill

A Statement Made March 30th, to the Committee on Interstate and Foreign Commerce of the House of Representatives in the Course of the Hearings on the Rayburn Bill (HR 5423)

By Bernard F. Weadock

Vice-President and Managing Director, Edison Electric Institute

I APPEAR on behalf of the operating electric light and power companies which are members of the Edison Electric Institute. This membership represents more than two-thirds of the electric light and power industry of the United States.

My concern is with the operating companies and Title II of the Act. This part of the measure is so profoundly important in the principles involved and in the series of consequences that would follow its adoption—should such be the sentiment of the Committee and of Congress—that I desire to point out as briefly as I can the effect of this Act.

Scope of Bill

The Act places under the jurisdiction of the Federal Power Commission *all agencies and instrumentalities* of the production and transmission of electricity where any of this electricity is destined for, or emanates from, another state.

Greatly Exceeds Actual Interstate Commerce

At this point I should like to point out that the scope of the bill extends the jurisdiction of the Federal Power Commission over power facilities which the United States Supreme Court has definitely stated are *not* engaged in interstate commerce.

Generation of Electricity Is Not Interstate Commerce

In Utah Power Co. vs. Pfost (286 U. S. 265) the Supreme Court said:

"While conversion (of the energy of falling water into electricity) and transmission are substantially instantaneous they are, we are convinced, essentially separable and distinct operations. . . . There is production as well as transmission of a definite supply of an article of trade. The process by which the mechanical energy of falling water is converted into electrical energy, despite its hidden character is no less real than the conversion of wheat into flour at the mill."

Multiplicity of Transmission Lines Has Given Public False Impression of Extent of Interstate Transfer of Electricity

When we look at a map of the high tension lines of the United States we get the picture of a continuous network reaching from the Atlantic to the Pacific and from Canada to Mexico, covering the entire country excepting a narrow strip along the Rocky Mountains. It looks like a map of the railroads, and gives the same impression of extent, continuity and disregard for state boundaries. There has grown up a belief that there is an analogy between the interstate railroads and the lines transmitting power, which is exemplified in the question, frequently used as a form of argument, "since the federal government regulates interstate railroads why should it not also regulate interstate power transmission?"

Perhaps the first step in considering the legal questions and public policy arising from possible federal regulation of interstate commerce in electricity, is to disabuse our minds of the thought that similarity exists between the railroads and the electric utilities in their interstate aspects. The likeness shown on the map is one of appearance only. The federal government, under the Transportation Act of 1930 does not regulate *all* railroads. It takes jurisdiction *only over common carriers* and regulates them as such. This term covers practically all railroads, but none of the electric transmission lines are common carriers. The railroads sell transportation. They carry from place to place goods belonging to others. The utilities are manufacturers creating a product, (considering electricity as a commodity) carrying their goods to market themselves, and there, as merchants, selling it. *They do not carry for others.* A railroad car may be moved from New York to San Francisco crossing a dozen state lines in its progress. Electric current is rarely transmitted further than from one state to its next neighbor, crossing but a single state boundary. About eighty-five per cent of railroad transportation is interstate and, therefore, under federal jurisdiction. Almost the exact reverse is true of the utilities, about 83 per cent of all electricity generated is sold and consumed in the state of its origin. The Federal government through the Interstate Commerce Commission, has had little difficulty in absorbing control of the 15 per cent of intra-state railroad business, on the principle that the tail should go with the hide, but to accomplish the same result as to the electric utilities the tail would have to wiggle the dog.

Limited Amount of Electricity Actually Flowing in Interstate Commerce

It is freely admitted that sales and purchases across state lines between two separate utility companies constitute interstate commerce. Only a part of this transfer of electricity and a relatively small fraction of the total electric production of the United States is at present in this category and outside of the jurisdiction by the various State regulatory commissions.

In 1934, out of a total of 85 billion kilowatt hours of electricity available for distribution by the electric light and power enterprises of this country, only 17½ per cent, or 15 billion kwhr crossed a state line.

Of this amount, 14 billion kwhr or 16.5 per cent of the total generation of the country represented power produced *in one state and distributed to customers in another by the same company,* no separate company intervening or by affiliated companies between the generation in one state and the distribution to customers in another. The rates at which this direct distribution is sold to consumers are at present wholly

within the jurisdiction of the state or a subdivision thereof in which the sale is made.

The total amount of electricity generated in one state and sold to another company for distribution to customers in another state and so exclusively within Federal jurisdiction in so far as concerns the direct regulation of the wholesale rate was less than 1 billion kwhrs in 1934 and represented *only one per cent* of the power production of the United States.

Even in regard to this power it may be said that the rates which may be charged the ultimate consumer are subject to control by either state or local authorities. I may further emphasize the fact that in spite of these interstate power transactions over what is now a long period of years, not a single case of abuse has yet been cited.

The language of the proposed Act would extend the jurisdiction of the Federal Power Commission over every private power plant and transmission line in the United States except those serving isolated places and a few others with self-contained transmission systems, no part of which might, in the opinion of the Commission be in any way connected with any other line crossing a state boundary. These comprise less than 10% of the total business.

The Act would thus embrace, under its category of facilities engaged in or connected with interstate commerce, 90 per cent of all power plants and lines of the United States. I submit that the mere solicitude as to what might possibly happen to one per cent of the business does not constitute a sufficient reason to duplicate the present regulatory machinery and place the very substantial cost of double regulation on the business.

The net effect of imposing an additional burden of regulation on the operating companies would undoubtedly be to deprive many localities in the United States of the advantages of interconnection because most such interconnections are not of sufficient importance to induce companies to maintain interstate connections if to do so will mean the expense and difficulties of duplicate regulation.

Supply of Electricity Is Essentially a Local Problem

It is unquestionably in the mind of the public that the supply of great quantities of electricity to all points of the United States is already, or shortly will be, the established practice and that this great quantity of power goes without regulation of any of the state or local public service commissions. The picturesque and dramatic aspects of the transmission of electricity have been so publicized that the public has come to conclude that there is no limit short of the continental confines of the United States to the transfer of energy.

Nothing could be further from the truth.

While there are many operating advantages in tying together a lot of power plants into one system and in supplying intervening communities from the "high lines" which constitute these ties, the principal function of transmission lines is to connect neighboring and adjacent sources of power. If we must stick to the comparison with the railroads, these transmission lines are largely comparable to railroad sidings, not long distance trunk lines.

Most of the Electricity Is Used Within 20 Miles of the Power House

Far from moving over great distances, most of the electricity now used in the United States never gets more than 20 miles away from the power house where it was made. Notwithstanding the existence of thousands of miles of transmission lines and the occasional transfer of power over quite a distance during an emergency, *the travel of the average kilowatt hour produced in the United States from its point of production to its point of consumption last year was only about 22 miles.* If we take out the power supply of California, with its hydro-plants up in the mountains and its customers in the Central Valleys and along the Coast, the average for the rest of the United States would have been only 18 miles.

To a large extent this is the result of economic factors which have dictated the location of steam plants in the near neighborhood of the large markets for their power in our seaboard cities and the great industrial regions of the country. It is also the result of the increasing economies being effected in the generation of electricity by steam near the centers of use as compared with the cost of making water power developments at a distance and of bringing this power to market over long transmission lines.

The Act Would Include, in Addition to Electric Light and Power Companies, Many of the Largest Industrial Enterprises of the United States

Electricity for public use is produced by other enterprises besides public utility companies. Many large industrial plants are interconnected with the transmission systems of the electric light and power companies. They interchange power to the mutual advantage of each. Sometimes they supply electricity to the company systems, at others they draw electricity out of them. Their power plants are as much facilities affecting interstate commerce as are the generating stations of the companies themselves.

A strict interpretation of this bill would include the power plants and through them, the operating and accounting and financial methods of these corporations, and Title I would provide for their dissolution.

"Giant" Corporations as Compared with Present Day Industrial and Railroad Enterprises Are Largely Absent in the Electric Light and Power Industry

In 1933 there were *1,681 operating companies* of record in the electric light and power business.

Of these 1,601, or 97½ per cent of

NET INCOME (AFTER INTEREST AND OTHER CHARGES) OPERATING ELECTRIC LIGHT AND POWER COMPANIES

(Including earnings from gas, water transportation, etc. in associated utility enterprises).
1933.

(Large Companies as Given in Moody's Manual)

Net Income Bracket	Number of Cos.	Total Net Income	Average per Company
More than $10,000,000	7	$123,696,000	$17,670,000
Between $5,000,000 and $10,000,000	12	80,996,000	6,750,000
Between $2,000,000 and $ 5,000,000	29	89,921,000	3,100,000
Between $1,000,000 and $ 2,000,000	32	48,312,000	1,510,000
Companies with Net Incomes above $1,000,000	80	$342,925,000	$ 4,286,500
Large Companies with Net Incomes below $1,000,000 (including 3 with deficits)	76	38,037,000	500,000
All Small Companies	1525	64,738,000	42,450
Total Electric Light & Power Companies	1681	$445,700,000	$ 265,000

the total, had a net income after interest and other charges, of less than one million dollars and the average net income of this group was less than $60,000 in 1933.

The average for all the 1,681 companies engaged in the business was only $265,000. Last year's figures are not yet available but they will be materially smaller than even this $265,000.

The average size of the companies in the various net income brackets are shown by the table on the preceding page.

Public Utility Companies, both Holding and Operating, Are Relatively Small Affairs When Compared With the Great Industries of the United States

Judged from the standpoint either of gross revenues or net income, public utility companies are small when compared with other great industries in this country.

Only two utility companies had *gross revenues* in 1933 which were as great as the $83,214,000 *net income* of a large motor car manufacturer. The total revenues of the ten largest utility companies in 1933 were less than that of a single steel corporation alone and, if 1929 were taken as an example, the revenues of such steel companies would have exceeded in size that of *all* of the electric subsidiaries of *all* of the public utility holding companies at that time.

There are about *1,300 electric operating companies which are little enterprises confined entirely to small restricted localities.* Almost all of these companies are locally owned and locally operated by organizations which average only 20 people. In many of them the president is usually also the manager, meter reader, bookkeeper and general man-of-all-work.

There are 62 large companies which serve only one city and its immediate suburbs. They serve 70 per cent of the entire population of all places of 50,000 people or more. The conduct of all this business is entirely under the control of state or local regulatory authorities.

Regulatory Power of Federal Power Commission Practically Terminates Private Management of Operating Companies

The Act, under Sec. 203(b) authorizes the Federal Power Commission to direct any utility company within the scope of the Act to add to, repair, improve or change facilities according to any scheme that the Commission may have in mind.

This gives the Commission powers never even contemplated by any regulatory body. The State Commissions have steadily maintained and the courts have upheld the sound American principle that regulation cannot take the place of management and that the details of the conduct of business were the responsibility and duty of the people that operated it.

The Act reduces company management to a position of complete subservience and virtually authorizes the confiscation of the property and since its findings of fact are conclusive there *can be no review* of the exercise of this authority by the Power Commission. Congressional Acts are subject to review, why not acts of its agencies?

New Capital Requirements

Unless we believe that we have seen the peak of America's industrial expansion and the future years will only show a gradually stagnating country and a lower standard of living, we must look forward to the continued increase in the use of electricity. Local communities will grow as new factories are established and additional goods are produced by those now operating. Great as it already is, the expansion and diffusion of electric service has still large areas yet to be supplied. The use of electricity by the individual consumer has not yet stopped growing.

All this means the eventual construction of more power plants and the extension of lines. Under this Act, however, none of this can be undertaken unless a certificate of convenience and necessity has first been obtained from the Federal Power Commission and then under such terms and conditions as it may prescribe.

All of it means the raising of new capital at a time when the investing public has become thoroughly alarmed at the practical results of this Act, which makes the Commission the *actual manager* of the property while at the same time, the officers and employees remain responsible to the investors and customers of the Company.

Future Financing Made Virtually Impossible

Further than this, the Act authorizes the Federal Power Commission to undertake the forced coordination in regional groups of privately owned facilities under the direction of the Commission. These regional groups may be composed of such units as the Commission may see fit. Wherever the Commission finds it necessary or desirable it may direct a public utility to make additions, extensions, improvements or changes in its facilities.

The situation might easily arise where an operating utility company would be forced to undertake a large uneconomic construction program. It would be confronted by the necessity of raising money at a time when investors have been so alarmed at the loss by the utility of control over its own property and investment that financing by operating companies was rendered virtually impossible. Not only would the credit of the company be greatly depreciated but the standing of the underlying bonds would be so deteriorated that they would no longer conform to the standards required for the investment in them by savings banks, institutions and trust funds.

Position of the Bondholder Jeopardized

The operating utilities of this country have outstanding more than 6 billion dollars in bonds. Many of these represent actual mortgages on particular pieces of property whose future earning power this Act hands over to the discretion of the Federal Power Commission. They represent actual bona fide physical property and are widely held, not only by individual investors, but by fiduciaries of all kinds all over the United States.

A prominent speaker at the annual convention of the Association of Life Insurance Presidents has called attention to the fact that public utility bonds constituted more than 8 per cent of the assets of all the life insurance companies in the United States. Similarly, a New York investment house has pointed out that public utility bonds constituted 18 per cent of all productive funds of the thirty leading universities and colleges of the country and that in one of the country's outstanding philanthropic foundations, 31½ per cent of all bond holdings were in public utilities. Two billion dollars are now invested in utility bonds by savings banks and trust companies, directly and indirectly affecting millions of depositors.

It has repeatedly been stated by the advocates of this legislation that these bondholders have little to fear from this Act.

I only wish that this were so.

Restrictions covering the legality of investment by savings banks and certain trust funds are very particular as to the earnings of the company that issues such bonds. A certain amount of junior securities must be outstanding. The net income of the company must have exceeded twice the interest requirements

on the bonds over a period of years. There are other requirements, all designed to protect the bondholder by providing a margin against adverse conditions. When these requirements are no longer met, the bonds cease to be legal investments. It is not difficult to foresee situations where the earnings of companies will be greatly reduced by the use of a rate base founded on "prudent investment," where operating expenses will be greatly enlarged by the shackling of management and where the additional financing can be undertaken only at usurious rates of interest. Under these circumstances the margin of protection on these bonds will be reduced to a point below the legal limits.

I say to you in all sincerity that the bondholders in the operating companies if made subject to this Act may well be uneasy over the integrity of their investments.

In the Long Run, the Consumer of Electricity Will Be the Greatest Sufferer

One of the principal reasons assigned for this legislation is to reduce the price of electricity to the consumer. When this statement is made it almost always applies to the domestic user of electricity. Little criticism has been made of the cost of service to the business user and no mention has been made at all of the cost of industrial power.

I do not want to take the valuable time of this Committee in discussing rates except to point out that rates for residence electricity are the only things in this country that have shown a steady decline year by year during the fifty years of the electric light and power companies' existence. The average expense is only 9 cents a day and the total bill for domestic electric service in the entire country is less than the total tax on gasoline.

It is not the price which is the true concern of the consumer. It is the availability, reliability and steadiness of service in which he is interested and when management is deprived of its authority these things inevitably begin to suffer. When the ordinary routine matters of operation have to be passed upon by a distant Commission in Washington and when all phases of the business become encased in a concrete-like standardized rigidity, men lose heart. Most of us are human and the greatest driving force in the expansion of electric service has been the ingenuity, courage and just plain hard work on the part of the managerial and technical staffs of the operating companies.

Increased uses of service and all the benefits which it confers do not automatically come from the mere reduction of rates, although it is absolutely true that reductions in the average cost inevitably come with the increase in the amount of electricity used. The benefits of electricity must be impressed upon the consumer by active salesmanship and by the constant maintenance of high standards. When these are discouraged business stagnates. Stagnation in a business where there still remain great possibilities of new discoveries and opportunities for technical improvement will inevitably result in a "freezing" of service and a denial to the consumer of the advantages and improvements which will accrue from the farther progress of the industry.

Instead of Making Electricity Cheaper, the Act Will Raise the Price of Service to the Consumer

The first direct effect of the Act will be to greatly increase the cost of everything purchased by electric light and power companies. Sec. 12(d) (page 47) states that:

> "It shall be unlawful for any person engaged in the business of performing service, sales or construction contracts . . . to enter into or take any step in the performance of any service, sales, or construction contract with any public utility company . . . in contravention of such rules and regulations or orders regarding reports, accounts, costs, competitive bidding, disclosure of interest, duration of contracts, and similar matters as the Federal Power Commission shall prescribe. . . ."

As this is worded it means that any organization having a contract with any public utility company for the supply of coal, oil, lumber, cement, or anything else, must submit its business and its books to the scrutiny of the Federal Power Commission and abide by such rules as the Commission may elect to promulgate.

It is obvious that no organization, now enjoying its freedom of action under the present competitive business conditions of this country, will voluntarily submit itself to this sort of regulation unless it is paid for so doing. Business men do not have to sell anything to public utilities unless they wish to do so and the prices which they charge will reflect not only the competitive price for their goods in the open market but an additional, heavy, surcharge for the jeopardy in which they are placed for dealing with a utility company. All this enters into the cost of the utilities' service and is immediately reflected in the rates charged to consumers.

Labor Will Not Benefit from This Act

There are at present about 230,000 people employed in the electric light and power companies of this country. These employees are, and always have been, among the highest paid of any industry in the United States. In the last month of record, (December, 1934) their average weekly earnings were $29.85 and their average hourly earnings 77.2c. This was 50 per cent above the average weekly earnings of all persons employed at that time in manufacturing industries of $19.73 per week and 38 per cent above their hourly earnings of 56c.

The stability of employment has likewise been among the highest of any industry. At the lowest point of the depression it had declined by only 23 per cent from the 1929 levels, while employment had declined by 43 per cent in manufacturing industries, by 45 per cent on steam railroads, and in some special industries, such as mining, by as much as 83 per cent.

Stagnation and rising costs in an industry never help the wage earner and the net effects of regulation have always been to reduce employment to minimum levels. The progressive decline in the number of people employed on steam railroads from a high point of 2,022,832 in 1920 to 948,902 in December of 1934, while not wholly attributable to regulation, nevertheless illustrates the effect on employment of a stagnant industry confronted with rising costs and decreasing rates. The same conditions will be produced by this Act in the electric light and power industry and will be followed by similar conditions of employment.

The proposed Act unjustly discriminates against private plants and in favor of public and municipal plants.

TOWARD DICTATORSHIP

The Rayburn Bill . . . may be an enemy of socialism. But if this is so, it IS a warm friend of dictatorship and if it passes it will speed us that much faster along the path toward absolute dictatorship. It would give one single commission permanent jurisdiction over all holding companies directly or indirectly related to electric light, power and gas companies of every kind and later can be extended to cover every conceivable kind of business, from shoe shops to professional services.—*Boise, Idaho, Statesman.*

Protests Against Rayburn-Wheeler Bill Rise to Extraordinary Proportions

PUBLIC indignation against the destructive features of the Rayburn-Wheeler Public Utility Act of 1935, now being considered by House and Senate Committees, has reached extraordinary proportions, according to the newspapers and statements from members of Congress. The latter have been deluged with thousands of letters in condemnation of the Rayburn Bill; a great number of newspapers throughout the country have denounced it through editorials; the National Association of Railroad and Public Utility Commissioners, state regulatory commissions, numerous business and civic groups, stockholders organizations, and other bodies have voiced their protests.

The hearings on the Rayburn Bill (H.R.5423) opened on February 19th before the Committee on Interstate and Foreign Commerce of the House of Representatives, with testimony by Dr. W. M. W. Splawn of the Interstate Commerce Commission on behalf of proponents of the bill. Dr. Splawn was followed by Robert E. Healy of the Securities and Exchange Commission; Frank R. McNinch, Chairman, Federal Power Commission; Lester S. Ready, Chief Consultant, National Power Survey; Clyde L. Seavey of the Federal Power Commission, and Dozier DeVane, Solicitor, Federal Power Commission. Hearings devoted to statements by these gentlemen continued through March 13th.

The utilities were permitted to offer testimony on the bill on March 14th when Wendell L. Willkie, President, The Commonwealth and Southern Corporation, appeared before the Committee to testify as to the adverse effects of the bill on utility companies and investors. Statements and testimony from those opposing the bill were continued through the first part of April. Among those who have appeared against the bill are: Preston S. Arkwright, President of the Georgia Power; John E. Zimmermann, President, The United Gas Improvement Company; William Chamberlain, Chairman of the United Light and Power Company; Charles W. Kellogg, Chairman, Engineers' Public Service Company; Edmund W. Wakelee, Vice President, Public Service Corporation of New Jersey; Dr. David Friday, Consulting Economist, representing the Committee of Public Utility Executives.

Also James F. Fogarty, President of the North American Company; Clyde W. Reed, former Governor of Kansas, in behalf of investors of Kansas; Samuel Ferguson, Chairman, The Hartford Electric Light Company; Louis H. Egan, President, Union Electric Light and Power Company; S. R. Inch, President, Electric Bond and Share Company; John W. Carpenter, President and General Manager, Texas Power and Light Company, and Ernest R. Acker, President, Central Hudson Gas and Electric Corporation.

In addition to the testimony of those appearing in person, communications from various other public utilities, chambers of commerce, etc., have been read into the record of the Committee.

Mr. Willkie, in accordance with a promise made at his earlier appearance before the Committee, on April 2nd submitted to the Committee a plan of suggested Federal legislation with respect to the regulation of public utility holding companies and operating companies, and a Memorandum on the extent to which existing regulation of public utility holding and operating companies is adequate and can be helpfully supplemented by additional Federal regulation. In his letter transmitting the specific legislative proposals Mr. Willkie stated that "there is no indication on the part of the public utility industry to oppose any legislation which is soundly conceived for a legitimate purpose. However, to the extent that any proposed legislation is unsound or unfair or will result in loss to the investing and consuming public and put undue burden on the industry, it is the right and the duty of the industry to oppose it."

Mr. Willkie's statement of March 14th was published in the March issue of the E. E. I. Bulletin, and Mr. Ferguson's statement as well as that of Bernard F. Weadock, Vice President and

Another Kind of Machine Politics

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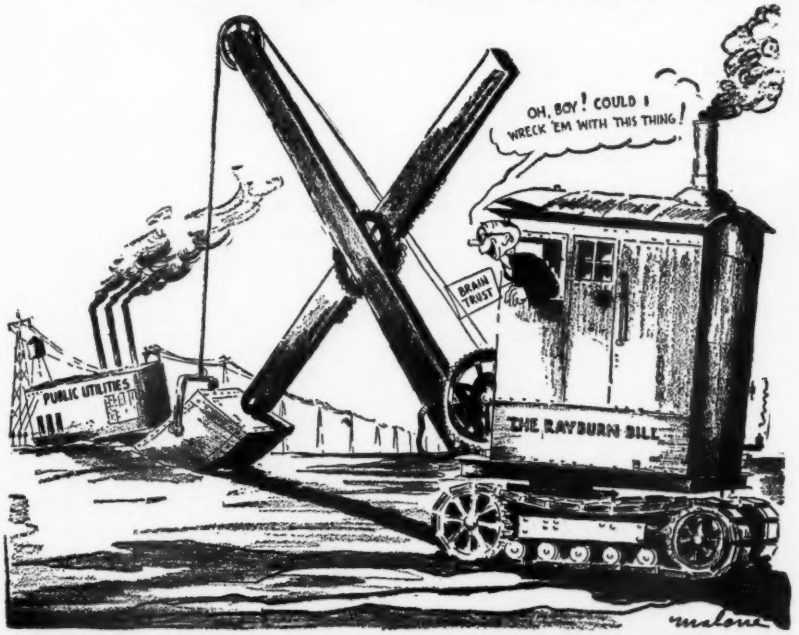


REGULATION is one thing—**RUIN** is another.

For years the Hearst newspapers have denounced and exposed evils existing in the utilities holding company system and have advocated **REFORM.**

But the Hearst newspapers have likewise **OPPOSED** confiscation of legitimately acquired private property without due compensation, the destruction of honest investments and the demoralization of useful business enterprises.

Consequently, in opposing the Rayburn bill, which would **WRECK** the twelve-thousand-million-dollar utilities industry, instead merely of making reforms, the Hearst newspapers are consistent in their long-established policy.

The Rayburn bill must be rejected **BECAUSE IT IS CONTRARY TO THE PUBLIC WELFARE.**

Washington, D. C., Herald

Ripsaw Legislation
HA HA, MY FINE FELLOW! YOU ARE IN MY POWAH!
POLITICS
RAYBURN BILL
INVESTING PUBLIC
BUREAUCRACY
The Wheeler-Rayburn bill, pending in Congress, is one of the most disturbing pieces of legislation ever suggested in this country.
By destroying holding companies it would wreck a twelve-thousand-million-dollar industry.
In so doing it would destroy the value of investments held by tens of millions of people, including the life savings of families, by as ruthless a method of confiscation as could be devised.
Abuses and bad practices in the holding company field must and shall be corrected and prevented from recurring.
But why kill a patient in order to cure his malady?
There is just one thing for Congress to do with the Wheeler-Rayburn bill—REJECT IT!

Chicago, Ill. Herald-Examiner

Omaha, Neb., Evening Bee News

Managing Director of the E. E. I., appears in this issue.

Hearings on the Wheeler Bill (S. 1725), companion bill in the Senate to the Rayburn Bill, are scheduled to begin the middle of April before the Senate Committee on Interstate Commerce.

Typical of the newspaper protests against the bill and the Administration's warfare on the utilities are the following excerpts, chosen at random, from a small percentage of editorials observed within the period of one week:

* * * * If Washington tried its very best to prevent recovery in business, it could not do better than to pass the Rayburn Bill.—*Toledo, Ohio, Blade.*

* * *

* * * * Congress should ponder long and carefully before it takes any action of this kind. It is a major step toward socialism; it is unfair to private capital; it runs counter to the American theory of business and government. And if taken it will call for similar moves in the direction of other industries.—*Newport News, Va., Press.*

* * *

* * * * Public opinion is swinging slowly but surely in the favor of power and light companies. . . . Pretty soon the politicians are going to have to answer the question of whether a reduction in rates is as important as a reduction in taxes. . . . And also whether this rate cut and control talk is a smoke screen to keep thoughts away from taxes. —*Boston, Mass., American.*

* * *

The Administration-backed measure that would eliminate holding companies has moved many editors of the country to voice their most emphatic disapproval of this step. It is perhaps the only Administration policy that finds editors mostly out of sympathy with President Roosevelt. * * * * —*Tyler, Texas, Courier-Times.*

* * *

The press throughout the nation has been outspoken in its disapproval of the Public Utilities Act. Disinterested students of the Wheeler-Rayburn Bill to eliminate holding companies have come to one sensible conclusion, and that is, that it is not necessary to kill to stop irregularities. * * * * *Chester, Pa. Times.*

* * *

* * * * Certainly, the holding company and corporation in general can be improved. Further regulation of a wise sort would be constructive. But when the President announces that the utility holding company "must go"—he goes too far. Tell him so.—*Kansas City, Mo., Journal Post.*

* * *

* * * * Unless the Rayburn Bill is greatly modified, tremendous losses will be suffered by investors in addition to those already sustained. The appraisal of this situation by investors is indicated by the fact that the stocks of public utility operating companies and of public utility holding companies are the only groups which are lower today than the bear market bottoms attained in June, 1932. This is not the result of the depression but is a natural consequence of the political agitation which has been directed against this industry.—*St. Paul, Minn., Pioneer-Press.*

* * *

* * * * Haven't we gone about far enough in this direction? Must we look forward to more and more years of government competition and control, more and more independents forced out of business by government interference, and more and more workmen made idle by government meddling? — *Brownsville, Pa., Morning Telegraph*

* * *

* * * * The people want to know how you expect to reform the holding company, by substituting a greater and more vicious type of holding company than anything ever known before.—*Atlanta, Ga., Georgian.*

* * *

* * * * Passage of the proposed act would be harmful to every industry, every investor, every user of light and power.—*Cortland, N. Y., Standard.*

* * *

* * * * It is, indeed, such measures as this that discourage business enterprise and put great obstacles in the way of recovery.—*St. Louis, Mo., Globe-Democrat.*

* * * * If it is constitutional to accept the proposed holding company legislation as it applies to utilities, it will be equally valid to extend the prohibition of the holding company to all other businesses.—*Hot Springs, Ark., New Era.*

* * *

* * * * After this country's experience with government operation of the railroads during the war period, we certainly do not want to experiment with government operation of gas and electric companies.—*Denver, Colo., Post.*

* * *

* * * * Many of the worst abuses of the holding companies in the boom era died of their own excess. Others have been corrected by state commissions or state legislatures. If any remain for congressional attention, under the commerce clause, let them be set forth in the bill and subjected to regulation at the hands of the proper federal agency without setting the entire industry on its head.—*Birmingham, Ala., News—Reprinted from New York Times.*

* * *

* * * * A further result of an outrageous Wheeler-Rayburn bill would be loss of faith and confidence in holdings among all investors, workers and consumers. It strikes a blow at all industrial stability and saps the public confidence so essential to recovery.—*Springfield, Mass., Evening Union.*

* * *

* * * * The holding company is an established and useful business institution. If in some cases it has been misused, by rogues, as it has been without question, that is no more reason to destroy the whole structure than the misuse of automobiles by kidnapers is a reason for abolishing motor cars. * * * * —*San Francisco, Cal., Chronicle.*

* * *

* * * * Government should play fair with the privately-owned utilities. We shall oppose any campaign against them that is notably unfair, unnecessary and un-American in principle.—*Rock Island, Ill., Argus.*

* * *

* * * * We are very frankly of the opinion that the railroad men know more about operating railroads, automobile men know more about manufacturing and selling automobiles, and utility men know more about how gas and electricity can most economically be made, sold and distributed, than the great majority of men who sit in the State Legislatures or the National Congress.

We would oppose such set-ups as are planned in the Wheeler-Rayburn Bill if for no other reason than that we heartily believe that a big step toward getting out of the depression would be taken if the legislatures of the various states were called into session and the Congress of the United States were called into session for a period of one year and restricted to doing nothing else but selecting useless, foolish, harmful bills that threaten and worry progress and then carefully repealing them.—*Stroudsburg, Pa., Record.*

* * *

* * * * We should desire to have any holding company scandal cleared up, in the public utility or any other field, but we may be sure this never will be done by a politically managed holding company of the Government. There are other ways for any cleaning up which may be needed and we should insist that these be used.—*Augusta, Me., Kennebec Journal.*

* * *

* * * * The passage of the Rayburn bill would either directly or indirectly have an adverse effect upon every Amer-

The Tail of the Modern Franklin's Kite—By Brown

Kansas City, Mo., Journal-Post

THE NEW BEAR RAIDER.

St. Louis, Mo., Globe-Democrat

ican citizen, and members of Congress should be told that such radical legislation is not desired by the people of this country.—*Mt. Holly, N. J., Herald.*

* * *

* * * * Destruction of holding companies controlling utility companies is not the only danger of the Rayburn bill. The bill as it stands applies to electric and gas industries. A simple amendment could bring all kinds of business under its scope. * * * * —*California, Pa., Sentinel.*

* * *

* * * * Citizens throughout Kentucky should take this matter up. Enormous investments are threatened not merely in utilities stocks and bonds but in holding company values throughout the whole field of corporate organization.—*Lexington, Ky., Leader.*

* * *

* * * * If the administration wants to destroy the private utility business and set up a nationalized industry, the Rayburn bill provides an open road to that goal. * * * * *Wilmington, Del., News.*

* * *

* * * * Every stockholder and bondholder in industries of all kinds should unite to oppose this vicious bill.—*Lexington, Ky., Leader.*

* * *

* * * * It is evident that the President's renewed attack on holding companies all along the line has silenced the extreme left administration critics for the time being, but it leaves the exact character of the holding company issue in confusion and uncertainty, and has cost and is costing heavy losses to investors concerned.—*Topeka, Kan., Capital.*

* * *

* * * * At a time when the nation needs above everything else the restoration of confidence, the bill merits the defeat that the excess zeal of the utility reformers invites.—*Hartford, Conn., Courant.*

* * *

* * * * A vote for this bill will be a vote in favor of higher government costs and higher utility rates, without any corresponding benefit to anybody.—*Harrisburg, Pa., Courier.*

* * *

* * * * We believe that Connecticut opinion is against the passage of annihilatory Federal public utility laws tearing down a whole structure built up through years and sustained by and sustaining the people's savings.—*Hartford, Conn., Times.*

* * * * There is no need for such a law, in its drafted form.—*Ottuma, Ia., Courier.*

* * *

* * * * The public utility companies do not oppose fair regulation, and have so stated. The abuses charged against certain utilities would seem to have been corrected by the Federal Securities Act of 1933 and the Securities and Exchange Act of 1934. If any abuses remain, they can and should be corrected by appropriate legislation, not by the passage of a bill that would destroy an existing system and substitute a government-operated industry, which would cut values to a minimum, working hardships on millions of people. Those affected would be not only the millions of public utilities investors but the citizens of the country generally, because of the millions in tax revenue that would be written off, if governmental control and ownership should become an actuality. —*St. Augustine, Fla., Record.*

* * *

* * * * It is noted that this vicious and unfair Wheeler-Rayburn bill is legislation of the very type which Mr. Roosevelt at that time condemned, and it is many times worse. It breaks down the authority of the states, and it construes the interstate commerce clause of the Constitution so broadly, that, if the theory behind this bill should prevail, there is no business of any kind anywhere which could not be brought under Federal regulation, control and management. It is a bad bill in every respect. —*Erie, Pa., Dispatch-Herald.*

"A Direct Blow at the Middle Classes"

Stating that she was a self-elected committee of one to represent the financial middle class of America, Mrs. Agnes M. Jenks of New York City appeared before the Rayburn Committee on March 19th and made the following statement:

MR. CHAIRMAN and members of the committee, I do not represent any organization at all. I am just here as a plain American citizen. I have elected myself a committee of one to represent the financial middle class of this country who seem to have no representation over here at all so far as I can find out.

Now, this is not, strictly speaking, a holding company bill. It is a direct blow at the public utilities.

Now, a direct blow at the utilities is a direct blow at the middle classes of this country. We all know that, and especially the women, and that is why I am here, because 20 years ago, 15 years ago, the women thought utilities were our best and safest investment and went into them because of that.

Now, you all know that in Italy and Germany the professional and middle classes have been wiped off.

This legislation, if enacted into law, means the beginning of the end of our democracy right here, in my opinion.

I do not think this is a measure that you want to go forward with. I do not think it will accomplish its purpose. I believe that you can, of course, in your discretion, correct this ambiguity of the language of the bill, which is very badly drawn, but you cannot with a hot hand and wet towel wipe out the contradictions of this bill. It goes too far.

We are a very sick Nation, gentlemen, and we cannot afford to take too many hard blows. If you give a sick child a dose of castor oil under certain circumstances the child can endure it. It is a good thing. If you give the dose under other circumstances, or when the dose is not opportune or not properly prescribed, you kill the child; and in my opinion this measure is a killing measure. That is what it is. You can put in regulation if you think it is needed.

I have a horror, always have had, of holding companies, and interlocking directorates, and tax-exempt securities—especially against tax-exempt securities—but for this bill, I am another consumer and a smaller investor.

Now, the few pennies that I might save as an investor and that saving prorated through the country, amounts to nothing in comparison to the great losses that will be made, the losses of thousands and hundreds of thousands and millions of dollars, and I say it is a dose of medicine that we cannot suffer. We cannot allow it to go on, and I am speaking again, I say, merely and solely in my own right; but I do feel that I properly represent the middle minds, middle classes of this country, and I sincerely hope that this legislation will not go through. Thank you, Mr. Chairman.

Domestic Electric Service in 1934

Replacements Apparently Comprise Large Portion of Many Appliances Sold—Actual Use of the Average Appliance Much Less than Commonly Supposed

By William M. Carpenter
Economist, Edison Electric Institute

IN spite of a comparatively large increase in the total amount of current sold, the American housewife is apparently still exercising a considerable degree of economy in her use of electricity, if we may judge from a comparison of the figures of appliance sales with the actual volume of energy used for domestic electric service last year.

During 1934, the number of customers increased by 480,000 and appliance sales made, in several instances, conspicuously new high records. Lighting was very evidently stimulated by the active "Better Light-Better Sight" campaign. A total of 1,283,000 refrigerators were sold, coming on top of 1,050,000 units in 1933. Using as a basis for computation the average number of customers and refrigerators supplied during the year, the increase in sales of energy, attributable to those two sources alone

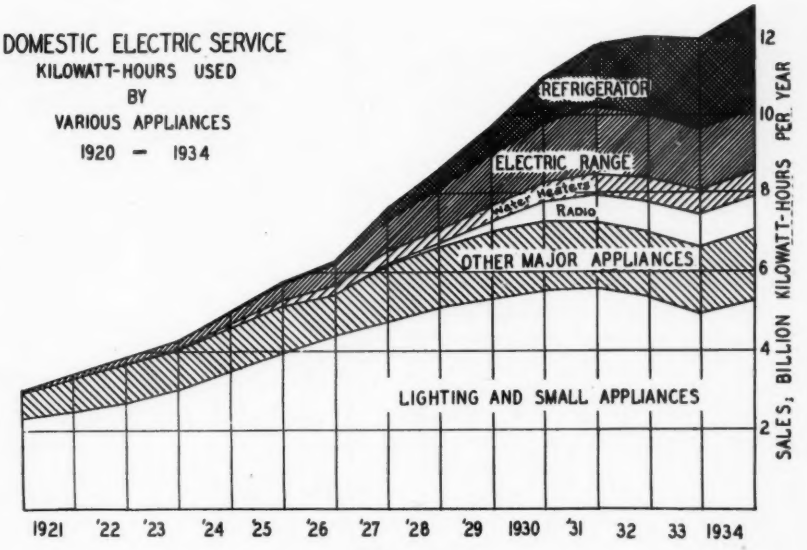


Chart 1

ENERGY USED BY DOMESTIC ELECTRIC APPLIANCES

An Estimate for the Year 1934

Appliances	Total Number of Appliances in Occupied Homes on 12-31-33 (1)	on 12-31-34 (2)	Average (3)	% in Use (4)	Total in Active Service (5)	Annual Kwhr Use (6)	Total Kwhrs Used in 1934 (7)	Average Rate per Kwhr (8)	Total Annual Revenue (9)
Flatirons	19,400,000	20,300,000	19,850,000	70%	13,900,000	50	695,000,000	5.3	$36,835,000
Vacuum Cleaners	9,400,000	9,650,000	9,525,000	70	6,665,000	36	240,000,000	5.3	12,720,000
Radio Sets (Socket Only)	15,000,000	16,500,000	15,750,000	70	11,000,000	75	825,000,000	5.3	43,725,000
Washing Machines	8,000,000	8,500,000	8,250,000	75	6,200,000	24	150,000,000	5.3	7,950,000
Toasters	8,000,000	8,000,000	8,000,000	37½	3,000,000	50	150,000,000	5.3	7,950,000
Percolators	5,100,000	5,000,000	5,050,000	40	2,020,000	50	101,000,000	5.3	5,350,000
Space Heaters	3,100,000	3,100,000	3,100,000	37½	1,165,000	50	58,200,000	5.3	3,085,000
Refrigerators	4,850,000	5,800,000	5,325,000	90	4,800,000	550	2,640,000,000	4.0	105,600,000
Ranges	1,000,000	1,050,000	1,025,000	90	925,000	1,750	1,619,000,000	2.5	40,475,000
Oil Burners	780,000	860,000	820,000	95	779,000	240	187,000,000	5.3	9,911,000
Ironing Machines	768,000	839,000	804,000	80	643,000	125	80,000,000	5.3	4,240,000
Water Heaters	268,000	300,000	284,000	75	213,000	3,000	639,000,000	2.0	12,780,000
Electric Clocks	7,500,000	8,100,000	7,800,000	90	7,000,000	18	126,000,000	5.3	6,678,000
Air Conditioning	1,000	2,000	1,500	100	1,500	1,200	1,800,000	3.0	54,000
Total above appliances							7,512,000,000	3.96¢	$297,253,000
Small appliances and Lighting					20,266,000	261	5,285,600,000	7.20	380,447,000
Total All Domestic Sales					20,266,000		12,797,600,000	5.30¢	$677,700,000

Notes: Columns (1) and (2): Estimates largely from ratios shown in "Electrical Merchandising" and other trade papers; being based upon the summation of annual production of appliances less an estimated replacement demand. Column (3): The arithmetical average of columns (1) and (2). Column (4): An estimate allowing for duplicate and unused appliances, houses unoccupied, vacation periods, etc. Column (5): The product of columns (3) and (4). Column (6): An estimate covering the current taken by appliances in Column (5), namely; the kwhrs. consumed by an appliance in constant and regular use throughout the year. Column (8): The 5.3¢ is the average rate paid for all domestic service throughout the United States in 1934; other figures are estimates based on the average reduction in rates for use of the quantity shown in Column (6).
Figures on air-conditioning are estimates based upon Air-Conditioning Survey of "Electric Light and Power"—March, 1935.

and disregarding all other items, was 937,000,000 kwhr, or 100,000,000 kwhr more than the total actually reported for all domestic service in the United States.

Apparently either a large number of appliances are merely sold as replacements or else the use of current by the various appliances has been overestimated. It appears that both of these factors are operating.

Replacements Growing Larger

Things wear out and it is not correct to arrive at figures for appliances in service by adding each year's sales to the previous year's total. Such computations lead to the assumption of a large increase in the connected load and to a vast hypothetical potential market for electricity if pre-depression prosperity should ever return again.

It would seem that most sales of small appliances now merely replace a new unit for an old one. In the case of electric ranges, a careful computation on actuarial lines, substantiated by the actual experience of those companies having the largest and oldest range loads, would suggest that half of the units sold during the years 1930 to 1934 inclusive have been for replacement purposes. Even in the case of electric refrigerators the replacement market is growing larger each year.

Electric Refrigeration News considers that 875,000 units which have been sold in past years are no longer in use. This corresponds closely with an actuarial figure of 930,750 replacements, arrived at by applying the standard mortality ratios for an 8½-year average life to the total units sold since the beginning of domestic electric refrigeration. The following table, constructed on this basis, shows how rapidly these replacements are rising.

DOMESTIC ELECTRIC REFRIGERATORS

Year	Sales to U.S. Consumers	Estimated Replacements	Total on Lines Dec. 31
Before 1925	70,000	500	69,500
1925	65,000	1,350	133,150
1926	190,000	3,400	319,750
1927	350,000	7,600	662,150
1928	495,000	15,400	1,141,750
1929	730,000	29,500	1,842,250
1930	770,000	54,500	2,557,750
1931	950,000	95,000	3,412,750
1932	770,000	155,000	4,027,750
1933	1,050,000	235,000	4,842,750
1934	1,283,000	333,500	5,792,250

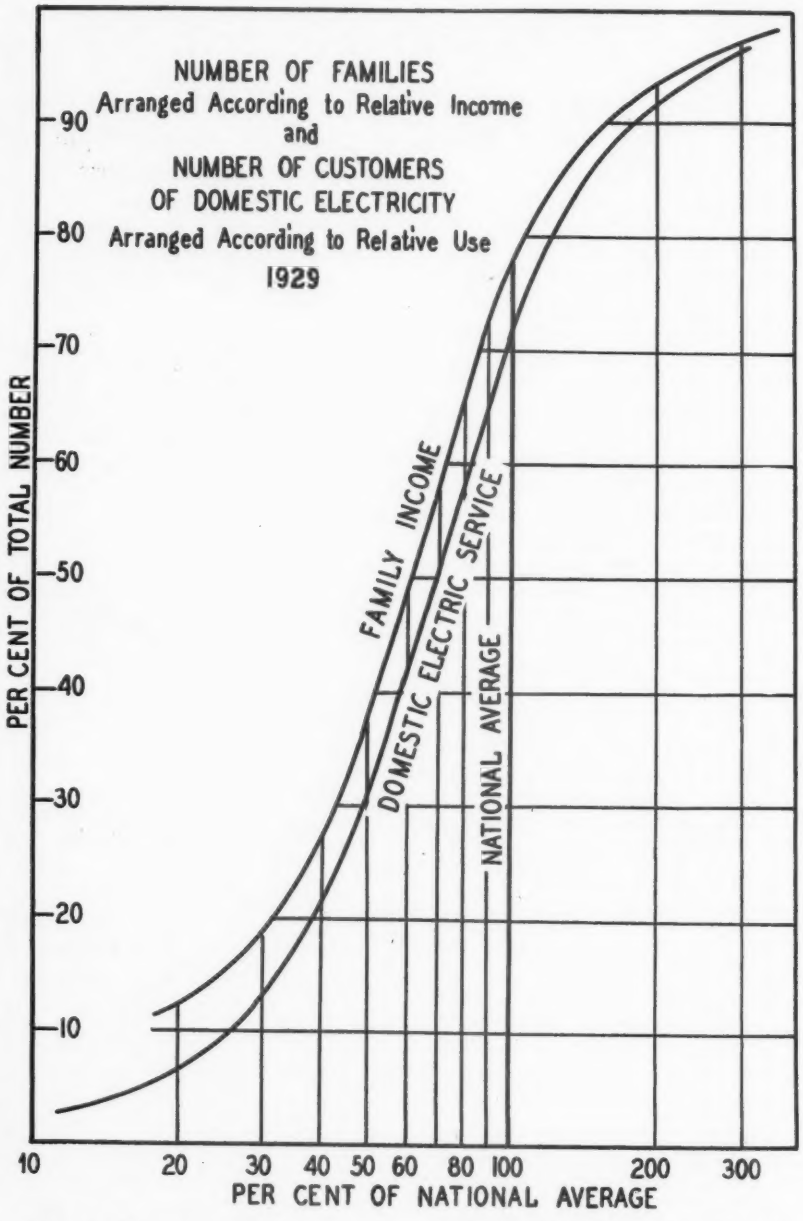


Chart 2—This chart shows the percentage of the total number of families using less than a specified amount of electricity. In 1929 the national average was 500 kwhr per year. Thirty per cent of the customers used less than 250 kwhr per year (or 50 per cent of the average); 91 per cent used less than 1000 kwhr per year (or 200 per cent of the average), etc.

Estimates Revised Downward

Several important revisions have therefore been made in the annual estimate of energy used by domestic electric appliances in 1934. The number of refrigerators and ranges in service has been considerably reduced to allow for replacements and the average annual electrical use for radios and refrigerators have been diminished because of the steady decrease in the size of the units now being sold. With the exception of the washing machine, whose use has been somewhat increased, the estimated percentages of appliances "on the shelf" have been left unchanged. It is freely admitted that all these ratios are now so low as to appear grotesque in the face of the usually accepted figures for appliances in common use, and yet there is no other way by means of which all these appliances can be accounted for

and the sales of current can still be made to tally with the totals actually reported by the light and power companies.

Appliances Use Less Than Usually Assumed

The following table shows the present effective kilowatthour per appliance per year, with the above-mentioned allowance for duplicate and unused appliances, houses temporarily closed, vacation periods, and trouble of all kinds.

ESTIMATED USE OF ELECTRICITY BY PRINCIPAL HOUSEHOLD APPLIANCES

Appliance	Nominal Annual Use per Appliance in Regular Service Throughout the Year	Per Cent of Time Out of Service	Actual Effective Annual Use per Appliance in Home
Flatiron	50 Kwhr	30	35 Kwhr
Vacuum Cleaner	36	30	25
Radio	75	30	52½
Washing Machine	25	25	18
Toaster	37½	50	18
Percolator	40	50	20
Space Heater...	37½	50	18
Refrigerator ...	550	10	495
Electric Range.	1,750	10	1,575
Oil Burner	240	5	225
Ironing Machine.	125	20	100
Water Heater .	3,000	25	2,250
Electric Clock ..	18	10	16

From these figures, it is quite evident that no customer, even with all the smaller appliances, can attain the national average of 631 kwhr per year unless he has at least an oil burner or a refrigerator. Allowing for a number of families that have electric ranges or water heaters but no refrigerators, it is apparent that only 6,000,000 customers, or 29 per cent of the total number, use as much as the national average and that 71 per cent of all customers use less.

This ratio is the same as it was in 1929, when an actual survey of the number of customers in the various consumption brackets gave the curve shown in Chart 2. This shows the total proportion of customers taking less than any certain number of kilowatthours per month.

This curve has an extraordinary resemblance to the curve of national income, as reported by the Brookings Institution* for the 27,474,000 families of more than one person in 1929. It shows the same economic characteristics and it has the same political implications.

In 1929, the 26 per cent of families in the top brackets had two-thirds of all the income. At the same time, the 29 per cent of families in the top brackets of electrical use took 63 per cent of all the kilowatthours. The curve suggests the fact that electrical use by the great mass of people is dependent largely upon the money they have to spend for equipment and appliances and that rate reductions do not, in themselves, result in increased use by the majority of small consumers.

*"America's Capacity to Produce and America's Capacity to Consume." Falk Foundation, digest pp. 41-42.

More Harm Than Good

(Continued from page 100)

6—Section 204—The power to order companies to furnish increase in capacity of power houses and transmission lines or the abandonment of any part thereof as no longer "used and useful."

7—Section 205—Jurisdiction over mergers of properties or intrastate companies.

8—Section 206—Jurisdiction over the issue of securities.

9—Section 210—Jurisdiction over standards of service including generation, voltage and frequency, meter accuracy testing, etc.

10—Section 301—Jurisdiction over accounting practices.

11—Section 302—Jurisdiction over determination of proper depreciation allowances.

12—Section 303—Jurisdiction over forms of reports.

In combination, the above sections remove from the states their control over the cost of intrastate power, since same is the residue left after the amount of and price received for such interstate power as the Federal Power Commission may determine has been supplied.

Owing to the fact that Section 202a makes a company's lines essentially a common carrier, the state is powerless to prevent competitive companies or municipal or Federal corporations from raiding the more profitable of that company's territory through the use of that company's own lines. With the lean territory only remaining, the costs of serving same are increased.

Real Idea of Section

The principal object of this section is obviously not to cover the present unregulated gap, but to use the accident of a small amount of interstate electricity to justify the creation of twelve or fourteen wholesale power pools wholly under Federal control as to what plants shall be run, what plants shall be built, what transmission lines built or abandoned; and from this pool current may be distributed to the ultimate consumers at prices to be fixed by the several states.

In this way the material resources of a state such as Alabama, rich in both coal and water power, are preempted for the use of other states so long as it can produce power at a low cost and the state has no power to conserve same for its own citizens. This is a far cry from filling the existing gap in regulation.

My suggestion as to filling the gap is very simple; namely, "to delegate to the Federal Power Commission the power to fix the price for any interstate transaction whenever the interested state commissions shall be in disagreement as to the power price for such transaction."

Such an enactment would wholly fill the gap without the wholesale elimination of the existing powers of the several states.

It may be urged that the creation of these proposed wholesale interconnections will be for the public good. I would answer that they have been and are now proceeding in the natural course as fast as their economic feasibility will permit. Under the control of a Federal bureau, experience shows that the economics of the situation will have little weight.

Operating Committee Meeting

DISCUSSION of the arrangements for the forthcoming Convention, detailed elsewhere in this issue, and consideration and approval of the budget for the year 1935-36 were the principal matters before the Operating Committee of the Institute at its meeting held at the general offices, 420 Lexington Avenue, New York, on March 20th, with President McCarter presiding.

The Chairmen, or their representatives, of the several committees of the Institute were present at the meeting. Mr. A. H. Kehoe reported for the Codes and Standards Subcommittee; Mr. P. W. Thompson, for the Prime Movers Committee in the absence of Mr. Alfred Iddles, Chairman; and Mr. Chase for the Transmission and Distribution Committee in the absence of Mr. Mark Eldredge, Chairman.

Mr. G. U. Stewart, Chairman of the Accounting Committee; Mr. F. D. Newton, Chairman of the Rate Research Committee, and Mr. J. H. Nickell, Chairman of the Insurance Committee, reported on the activities of their committees.

Mr. C. E. Greenwood reported for the Sales Committee in the absence of Mr. H. P. J. Steinmetz, Chairman. Mr. H. W. Reed discussed current developments in the field of rural electrification and Managing Director Weadock reported upon the progress of the hearings conducted in connection with the Rayburn Bill.

J. C. Barnes Wins First Prize for New Orleans Company Advertising Campaign

FIRST prize in the First Annual Competition of the Advertising Club of New Orleans, for the most outstanding advertising campaign of 1934 in New Orleans, was recently awarded to Jay C. Barnes, director of advertising, New Orleans Public Service, Inc., for the company's 1934 campaign. Competing with agencies handling national campaigns, as well as manufacturers, department and retail stores and other New Orleans advertisers, the local utility company was given first rating over a field of approximately 25 contestants.

Commemorating the award was a parchment scroll certificate signed by the club president and judges of the campaign, and a 3 x 5 engraved sterling silver plaque.

Public Service's entry in this competition consisted of four campaigns:

(1) Laundry equipment campaign (July and August, 1934)
(2) Home cooling campaign (air conditioning and attic ventilation—June, July and August, 1934)
(3) Special Dollar Day promotion (Pin-it-up lamp—August 15, 1934)
(4) Study and Reading Lamp Campaign (September-October, 1934)

In making the award the judges, it was announced, were guided largely by the excellence of the merchandising ideas, the effective manner in which they were presented, and the complete report of cost and results which accompanied each campaign. Newspaper, car card and direct-mail advertising were all employed in the campaign.

Lakeshore breezes for every room
WITH A
HOME COOLING SYSTEM
INSTALLATION AS LOW AS
$150.00
Make your home a veritable Lakeshore resort . . . enjoy cool, delightful breezes in every room of the house . . . end the scourge of sleepless nights and depressing days with a Home Cooling System. Merely snap a switch . . . fresh, healthful air comes in through the windows sweeping out the heat and pushing it up to the attic where it is carried out by a large, quiet fan.
It's simple to install . . . New Orleans' homes are particularly adaptable to it . . . installations can be made for as low as $150 . . . terms can be arranged over long periods . . . These systems are bringing heat-relief to many who never before dreamed they could have air cooling without a big investment . . . Call MAin 4900, Extension 444, and let one of our engineers make a survey of your home . . . no cost . . . no obligation.
No Other Servant Works As Cheaply . . . Use More Electricity
New Orleans Public Service Inc.
The cost of operation for the average installation is 5c a day.

Don't Cheat Yourself of SLEEP !
AIR-CONDITIONING
assures you
Comfort and Rest
Ever wake up in the middle of a sweltering, breathless night unable to sleep because of the oppressive heat? . . . when even the thinnest covering is moist and sticky, and no amount of tossing and turning finds a cool spot in the bed? Of course you have . . . and heavy is the penalty the next day . . . frayed nerves, bad temper, a generally let-down feeling . . . all the result of lack of sleep.
Why not LIVE AND SLEEP this summer in an atmosphere of refreshing coolness, with AIR CONDITIONING?
The cost is far below what you would expect . . . self-contained units are priced as low as $320.00, and with cheaper electricity, the average unit can be operated for approximately 20c a day.
If you've thought of AIR CONDITIONING as a comfort-luxury you cannot afford, let our engineers convince you how inexpensive it is to enjoy. Call MAin 4900, Extension 444, and let us make a survey for you without obligation. Do it today and enjoy your summer.
No Other Servant Works As Cheaply—Use More Electricity
New Orleans Public Service Inc.

Of particular interest was the Home Cooling Campaign consisting of newspaper advertising and direct mail. Nine newspaper ads were run from May 21st through August 8th. Reproductions of two of the ads are shown on this page. Beginning the first of June the direct mail pieces started going out—the first to be mailed was a folder captioned "Cool Your Home Through Attic Ventilation." Three thousand pieces went to a selected mailing list of better customers. At intervals up to August 1st, this first direct-mailing was followed by two direct-mail pieces on air conditioning and two more on attic ventilation, the highest mailing reaching ten thousand.

Mr. Barnes states that "advertising of this type has of necessity to be considered in the light of promotion, and this company was highly gratified that at the conclusion of the summer, forty-seven home installations of attic ventilation fans and nine home installations of air conditioning units had been made."

The Alleged "Power Shortage"

Mr. Weadock Replies to Federal Power Commission Statements —That 1937 "Shortage" in the T.V.A. Area

The Federal Power Commission in a series of releases to newspapers of its "Interim Report of the National Power Survey," has stated that resumption of normal industrial activity would find most sections of the United States critically short of electric power, and that in case of a war involving the United States, the industrial centers of the East and Middle West would be crippled to a disastrous extent through shortage of generating capacity.

These statements of the Power Commission have been refuted by Bernard F. Weadock, Vice-President and Managing Director of the Institute, who characterized the assertion of a power shortage as a case of "wishful thinking" and the reports of the Commission as efforts "to frame support and justification for the Federal Government's uneconomic and unjustifiable water power projects." Mr. Weadock's statements follow:

Statement by Mr. Weadock on April 2nd in reply to news release of Federal Power Commission of April 1st

THE assertion that a shortage of electric power is imminent largely constitutes a case of "wishful thinking." It is based upon the assumption of the return of industrial activity to the levels of 1929, assumed by the Federal Power Commission to be "normal." I only wish that the electric light and power companies of this country could share the optimism of the Commission. It is futile to predict the return of industry to pre-depression levels in the face of the repressive legislation continually being considered by Congress. In particular, there will be no return to 1929 levels as long as the barrage of hostile statements and destructive acts continue against public utility companies.

According to statistics kept by the Edison Electric Institute, there is, *at the present time,* in this country as a whole, an excess of 20 per cent, or nearly 6,000,000 kw, of electric generating capacity, over and above that necessary to carry, with adequate reserves, the present load. These totals do not include the plants now being built by the Federal Government. Some regions—especially those where the Federal Government is building its hydroelectric plants—show much larger surpluses, while other areas show smaller figures.

The regions listed by the Commission as now having substantial surpluses of generating capacity contain several of the Government's large dams now being built. The Tennessee Basin and Southern California areas could properly have been included in the list, and these substantial surpluses will be greatly increased by the Government plants in process of construction. For example, in Southern California the present excess capacity is 40 per cent and the addition of Boulder and Parker dams will increase this excess to 140 per cent.

The Commission's statement that the supposed surplus of electric generating capacity in the United States was a myth conflicts with the comparatively recent report of the New York Power Authority which assumed that installed capacity need only be 20 per cent in excess of the annual "peak" load. On that basis the present excess capacity in New England and the Middle Atlantic States alone would be nearly 4,000,000 kw, or almost 40 per cent of the present installed capacity in those regions.

The electric light and power industry through years of tremendous industrial expansion in this country has always been able to meet the needs of rapidly increasing demands for its service and, provided the industry is not crippled by legislation and by assaults on its credit, including the levying of heavy and discriminatory taxes, it will easily be able to meet the demands of future growth. Engineers of this industry are constantly studying and planning to supply more electric service in the most efficient and economical way. The country need have no fear that these experienced men will not be able to meet any new demands that may arise for greater power facilities. The industry will heartily welcome more business and the need for again enlarging its plants.

The Federal Power Commission views with alarm the possibility of a shortage in case of war. The electric light and power industry for many years has cooperated with the War Department in its war procurement plans. The industry is prepared at this time to meet any power demands that may possibly arise under the coordinated plans for procurement of war supplies, which are designed to avoid creating a congestion in any one locality. When the United States entered the World War in 1917, the installed capacity of the electric light and power industry was only 9,000,000 kw as compared with 32,250,000 kw installed today. At that time there was practically no interconnection between central stations to permit unused capacity in one station to be applied in nearby systems. The advantageous integration of central stations into large power systems has largely been effected since that time.

In the supply of munitions of war, power plants out on the Columbia or Colorado Rivers, or even in the Tennessee Basin, are of little or no significance. The important factor is the maintenance of an adequate coal supply at the steam generating plants in the existing industrial regions.

The Commission admirably emphasizes the extraordinary growth of the public utility industry of the United States and the remarkable progress in the residential use of electricity even through the depression; demonstrating the fairness and acceptability of prevailing rates. The electric light and power companies will welcome the opportunity to participate in, and contribute to industrial development and growth and the further expansion of the use of electricity in America.

Statement by Mr. Weadock on April 8th in reply to news release of the Commission of April 7th

THE Federal Power Commission's further news report picturing an imminent power shortage in the United States is evidently intended to frame support and justification for the Federal Government's uneconomic and unjustifiable water power projects, as well as to foster the idea that the engineers of the electric light and power industry need guidance and technical assistance from government bureaus in conducting their work. Actually the present excess generating capacity over and above the requirement for normal reserves is 6,000,000 kilowatts or 20 per cent, and the present trend of output does not justify plans for further construction.

From an examination of the figures accompanying the report, it is clear that erroneous assumptions have led the Federal Power Commission's engineers to wrong conclusions. In their report they have assumed that the peak loads on the different power systems all occur at the same time and therefore arrive at a

theoretical peak demand for the United States of 23,000,000 kilowatts. Actually, peak loads do not coincide in time and, because of their diversity, the effective overall peak is only about 16,000,000 kilowatts, or 7,000,000 kilowatts less than they have assumed.

The Commission's engineers have arbitrarily disregarded a large amount of capacity in the older plants, evidently on the basis that these are no longer useful. There is actually 5,942,000 kilowatts of installed capacity in the United States more than the report shows, and this amount is three times the total net estimated shortage of 1,961,000 kilowatts shown by the Federal Power Commission's report.

These older plants are perfectly capable of supplying power in emergencies and of carrying system peak loads. Because the duration of these peak demands is short, old plants are ideally suited to this need. It would not be in keeping with efficient private operation to build new plants merely to operate them a few hours a year during emergencies and periods of peak demand and at the same time to tear down older plants entirely adequate and suited for this service.

In the regions of Federal projects under construction or now proposed, the Federal Power Commission has taken particular pains in setting up a justification for these government projects. Thus the way is paved for the highly uneconomic Passamaquoddy Bay project by claiming that Maine, alone among the New England States, is shy of adequate power.

The electric light and power industry is and always has been prepared to meet all demands upon it by the users of its service. It would not be justified, however, in undertaking the immediate construction of additional plants which are not now necessary while waiting for the return of business, the development of which we hope for but which is not yet in sight.

That 1937 "Shortage" in T.V.A. Area

THE Chattanooga *Times* of April 10, in a special dispatch from Washington, says that sharp contradiction of estimates by the Federal Power Commission and T.V.A. that a shortage of electric power confronts the country came on April 9 in testimony by official and unofficial witnesses before the House Military Affairs Committee in hearings on a bill to extend the authority of T.V.A.

According to the *Times* "A story of assumptions used in official estimates that the Tennessee valley states would be 300,000 kilowatts short of power demand in 1937 caused laughter among committeemen." The assumptions were disclosed by Percy H. Thomas, of the National Power Survey, Federal Power Commission, who made the study for T.V.A.

The *Times* continues: "Mr. Thomas' estimates of the shortage, he revealed, were based upon assumptions that the entire Tennessee valley area would experience a maximum 'dry year' in 1937; that neither Norris nor Wheeler dams would be producing power in that year; and that certain steam plants of private utilities should be excluded from capacity figures as obsolete. Mr. Thomas said that if 1937 should prove to be a 'wet year' there would be a surplus of about 1,000,000 kilowatts in the valley.

"Gen. George B. Pillsbury, Assistant Chief of Engineers, testified that the army engineers in their annual report last summer found a surplus of 583,000 kilowatts in the Tennessee Valley, and a national surplus of 7,457,000 kilowatts. Private power companies always in the past before the depression based new developments of energy on estimates of a 10 per cent annual increase in consumption, he said.

"Col. C. T. Harris, of the procurement division, testified there is no alarm there over a possible power shortage in the event of war. The department calculates a war demand for electricity would not be 25 per cent in excess of the demands of industry in 1929, he said."

MR. THOMAS TESTIFIES

Mr. Thomas is Chief of the Power Requirements Division of the National Power Survey. The following extracts are from testimony taken from the official transcript of the hearings before the House Military Affairs Committee on April 9:

Mr. Thomas. . . . I am here . . . to explain a special study which I made of the region tributary to the Tennessee Valley for the purpose of determining the question of power shortage or surplus there, based on the records which the Federal Power Commission has obtained. . . . This study was made at the request of the T.V.A. to get a quick, accurate determination, based on the best information that the Federal Power Commission had gotten from its survey as to the question of shortage or surplus of power in the region tributary to the Tennessee River. . . . That study is exceedingly exhaustive, based on the best available data that we have now, or have ever had. . . .

Now, knowing that the one question at issue might be whether the hydros now being constructed on the Tennessee River would be superfluous or not, I made this study on the assumption that these plants would be completed in the year 1937, and not before. That having been determined, I examined the records sent in by these companies (operating in the region) as to the load demand that they expected they would have to supply in that year.

Now, taking these dependable capacities, and taking the loads which these companies expected at that year which would be the first year in which it would be possible to use these hydro plants being constructed, and making certain adjustments, it was possible to see in a very dependable way, and concrete way in which you can count on the results, what the situation would be, and for the purpose of making it possible to use these figures for various programs that might be developed in this Tennessee River Valley, I assumed that the T.V.A. plants in my balance sheet would be only those now in existence, with the idea that as soon as it was determined what other plants might be available at a particular time, the necessary correction could be made in the plans to fit the particular assumption as to what plants were to be available.

Now, taking this situation on dependable capacities, the 1937 demands by the various companies, and assuming that the Sheffield steam plant . . . was in operation or was available, and that the Muscle Shoals plant as it now stands, without the Wheeler Dam, would be available, my figures showed a shortage of about 300,000 kilowatts.

I must explain that this is not the difference between the sum of the demands and the dependable capacity, because it is necessary to have a certain amount of reserves, and the question of reserves is to some extent a matter of judgment. . . . I made that assumption, and for various reasons I also provided for a little surplus capacity so that if the load goes faster than expected, you would not have to shut down. Then I added another 10 per cent to the reserves, and those are the figures which produced the shortage to which I have referred. . . .

. . . If the Norris Dam is considered operating, it will add to it 100,000 kilowatts, and, if the Wheeler Dam is operating, 32,000 kilowatts more.

This is in the year 1937, assuming that 1937 is a dry year.

If 1937 is wet, there may be a million kilowatt more capacity developed. . . .

Mr. May. Colonel, did I understand you to say that the grand total load at the present time in the States named was 2,112,000?

Mr. Thomas. I gave you the figures that these companies reported will be the load in 1937.

Mr. May. And the installed capacity in the territory is 1,076,000 on steam, and 2,332,000 on hydro, which makes a total of 3,508,000 kilowatts? Is that right?

Mr. Thomas. There was a certain amount that was taken as obsolete. After that is out, it comes to 3,351,000.

Mr. May. Without that deduction, and taking my figures, the grand total load requirement taken from the installed capacity would leave, in fact, a surplus of 1,396,000 kilowatts in 1937, if everything works out?

Mr. Thomas. You have not allowed anything there for reserves.

Mr. May. I know, but you took out something for reserves.

(Continued on page 126)

The Engineer and the Accident Prevention Program

Paradoxical as it may seem, engineers who come in contact with construction and operating forces can, even though they are not conscious of it, exert a powerful influence for good in strengthening the response to management's effort toward the elimination of every accidental happening that threatens in any way the well being of workers.

By W. R. Smith

United Engineers & Constructors, Inc.

Fourth of a series of articles sponsored by the Accident Prevention Committee, Edison Electric Institute, W. A. Buchanan, chairman

TO THE engineer responsible for the design and, therefore, the success of a project in all respects, there come certain very definite obligations with regard to the matter of accident prevention, but, in addition, there exists a great opportunity. For the most part, the thoroughly competent engineer, by which is meant one who is mindful of every phase of an undertaking with which he is identified, is conscious of his obligation to those who will come after him and assume their respective duties in the capacities of constructor or operator. In such respects, the contribution that is made by the engineer to the cause of safety of construction and operation must be predicated on certain very definite and fundamental attitudes toward the entire matter and on a clear understanding of the sources from which he may expect to obtain pertinent information that will guide him in his general considerations.

Of the opportunity that presents itself to the engineer in this connection, he may be unmindful. Strangely enough, his failure to think about it in such light and to take premeditated action, essential in the above consideration, does not lessen to any marked degree the contribution that he makes in this respect to the cause, provided his general attitude, his habit of thinking constructively, and that qualification which is characterized as personality, are all that they should be. "Why," you may ask, "can such an apparently paradoxical situation exist and be productive of good results?" And to that question reply is made that it will be obvious, to those who are observant as they are identified in one or another respect with the problem of strengthening what we call safety consciousness in the minds of workers, that the engineer's influence is what it is because of his being on the positive rather than the negative side of the question. Shall we say that he can supply the "positive bias" which will improve the functioning of the whole set-up? Let us see.

The design engineer must, in the very beginning, be conscious of the fact that he is in the position of being responsible for conditions affecting the constructor and the operator, and which neither will be able to alter to any marked degree. He must, therefore, fulfill his obligation in three respects:

1st—His own design features must be predicated on sound technical knowledge and experience which will insure reliability, efficiency, and economy.

2nd—He must be able to visualize, either out of his own previous personal experience, which is the more dependable, or out of such knowledge as he can acquire from his associates on construction, the respects in which he can reduce hazards of erection, etc., and give to the constructor the greatest latitude in his own operations.

3rd—He must be able to picture in his mind the finished plant in operation, under both normal and emergency conditions, and be qualified to apply the viewpoint of the operator as he makes his decisions with regard to general arrangements, clearances, accessibility, hazard elimination, etc.

From the first, or technical, standpoint, we may well expect proper solution of any given problem by a qualified engineer. Here, he deals with more or less well-established fundamentals and data. If his work is pioneering to some degree, because of the utilization by him of higher temperatures or pressures, of greater capacities, of new or relatively advanced features of design or arrangement, he will need to be conservative in such cases where he cannot support his own conclusions with data out of the experience of others. Here, the question of the safety of plant operators and workers in general goes hand in hand with that of safeguarding the investment and of guaranteeing the service of whatever nature against interruption or shutdown because of the failure of apparatus or equipment.

As we consider the second phase of the engineer's responsibility, that concerned with his obligation to the constructor, we realize that, whereas the engineer is in the position of being the one who can, with the exercise of good judgment, make it less difficult for the installation to be made with safety, yet, in general, his negligence, if there be any (except, of course, because of wrong technical approach), can be regarded merely as contributory. The construction force is responsible for the doing of work, and, in all respects, is expected to approach any construction operation with due regard for the hazards involved, and the technique in this respect is of much different character from that with which the designer is concerned. Fundamentally, the technique of construction involves the use of tools and equipment in ways correct and best suited to the nature of the work. But, if difficulties of erection, inherent in certain arrangements, are foreseen by the designer and either removed through change or adequately provided for, much of the burden of responsibility in these respects can be lifted from the shoulders of the constructor, and his thoughts and energies thus released for application to those problems which are peculiarly his own, and which, for the most part, arise out of the difficulties always experienced in the training of men in the ways of

safety in all its aspects. Here, therefore, does the engineer's obligation to develop that which can be produced economically stand out; for he may well see to it that he does not pass on to those who can do little if anything to improve them, situations which increase costs of construction because of complications in layout or congestion of the working forces, both usually imposing hardships on those responsible for schedules and necessitating extensive safeguarding and protection.

To the operator, the engineer's responsibility is real. In the first place, efficient and economical operation is expected; but, in the second and more important respect, from the standpoint of our present consideration, what the operator desires is safe operation, free from routine hazards and the dangerous situations so often found to exist at times of trouble, and which jeopardize the lives of workers during emergencies and rush maintenance work.

Maintenance features must be taken care of when the project is in the design stage, and the operator wants to be assured that those lessons that experience has taught in his particular field have been learned by the designing engineer, and that, where there has been no specific parallel experience, the engineer can so direct his thinking as a designer that he is cognizant at all times of the operating man's point of view, and regards all proposed new arrangements or processes through the eyes of him whose responsibility it will be to render dependable service safely. Of importance, then, are a thorough knowledge of operating routine and procedure and an understanding of the situations that will inevitably present themselves when, later, there is need for flexibility and adequate safeguarding of service during the making of additions or alterations.

The fundamental, therefore, which should be stressed is this: no designing engineer is justified in taking the point of view that it is the duty of construction and operating groups to respectively construct and operate safely anything that he may design. Rather is it incumbent upon the designer to take fully into account the points of view of constructor and operator alike and to accept, for serious consideration, suggestions and comments based on experience. Having established such a spirit of willingness to heed counsel and even criticism when constructively given, the engineer would find a corresponding desire and an effort being made to construct and operate safely everything that he had approved. Only in such spirit of cooperation and mutual regard for the problems and responsibilities of each group, can responsible individuals confidently anticipate that the best results will be attained in any major undertaking.

Specifically, then, the engineer's problem is to strike the proper balance between the expenditures that he can afford to make to improve what we will call the Safety Factor of his project and the costs which might otherwise have to be incurred because of possible accidents due to hazards that would not have been eliminated. Those hazards which experience had definitely shown to exist with certain arrangements or operations, we would expect to be eliminated in some effective way in new designs, but it is to the new developments that our greatest concern should be given in this analysis. No one can predict all of the conditions that will arise, nor the actual extent of the risk that will confront the constructor and the operator respectively, when they, in turn, are called upon to construct and operate in accordance with a certain layout or general arrangement. It is to a thorough analysis of all the possibilities, however, that we direct the engineer's attention, and in making such analysis and determining what, if anything, he should do, he has a right to assume reasonable knowledge, experience, and exercise of discretion on the part of those who, as members of field forces and plant crews, come after him and take up their work where he stopped.

We have considered the benefit to the engineer of the counsel of constructor and operator, but the engineer should not expect these counsellors to do more than give him the benefit of criticism of specific details, and this should not take the place of an actual review by the engineer, if such records can be obtained, of the accident statistics of companies having had experience comparable with that which will obtain on the project in contemplation. In instances where the company responsible for the design and construction bears such intimate relation to the utility, that the records and even the actual experiences are open and known and discussed fully by all concerned, then would there be in the minds of designing engineers the knowledge that they should possess as they go forward with the development of new designs. When relations are more distant, experience recommends a careful review by the designer of the accident record that is pertinent as it applies to construction and operation of earlier similar projects. In what better way can he prepare himself to avoid the pitfalls of the past and have his work push the front line of progress in this respect a bit farther forward?

Unfortunately, there are many who have developed out of their processes of thinking on the subject of safety an attitude that has resulted in their regarding accidents principally from the standpoint of whether or not they result in injury to a person, worker or otherwise. Experience, of course, has shown that for every so many accidents of a certain type, which have in them the potentialities of an injury to someone, there will be such an injury. The engineer is, therefore, aided by well-kept records of all such happenings, purely on the basis of improving the overall performances of apparatus and equipment and the dependability of tools and materials. The more thoroughgoing the analysis of such accidents, the more helpful will the record be, particularly because of the fact that the inevitable changes in construction and sometimes operating personnel may otherwise deprive the engineer of information of great benefit when he makes selections of arrangements, designs, types, and features.

With full knowledge of the competence of both construction and operating forces which will assume their respective duties in connection with the project, the engineer may, with justification, look to them to meet their own obligation and not impose on him the necessity of spending unduly large sums to eliminate that which occurs because of lack of assumption of responsibility.

Now as to the engineer's opportunity. It cannot but be recognized by workers who are above the average in intelligence and ability, that a large proportion of safety rules and regulations are made for the less gifted or experienced employees; in other instances, made to prevent all the careless and thoughtless fellows from bringing suffering upon themselves or their associates. These thoughtful men know, out of their observations, that these precautions occasion delays and additional expense at times, but realize that the situation is much like that with which society at large is confronted, and which necessitates the enactment of laws by which

(Continued on page 122)

Commercial Notes

By C. E. Greenwood
Commercial Director, E. E. I.

MR. THOMAS N. McCARTER, President, Edison Electric Institute, is serving on the Industries Award Committee for the National Radio-Essay Contest, "Home." The Contest is sponsored by Federal Housing Administration, industry, national educational and civic groups. The purpose of this activity is to focus attention of Young America on HOME, which is expected to create a greater interest in building activities. The basis of the contest is a continuity to be prepared by students in the high schools. There will be district and national awards, with grand prizes for two winners—a boy and a girl.

Each utility company and each manufacturer in the building and building service field will be requested to donate $5.00 toward the national prize fund.

THE first quarterly contest in connection with the Electrical Housewares Program on the training of salespeople is closed. Prizes will be announced in the April issue of *Electrical Housewares*.

The second quarterly contest is for Best Window Display of Small Appliances. The rules for the contest are as follows:

1. Display must be actually installed in a display window and in use at some time during the period from April 1 to June 30, 1935.
2. The window must feature the products of one of the twelve manufacturers that are contributing to the national activity. There are separate prizes for departmentalized stores, central stations and for other dealers, but the same rules apply to all.
3. In each of these three classes a first prize of $100 will be offered, a second prize of $50 and five honorable mention prizes of $10 each.
4. The judges will consider sales appeal, attractive appearance and individuality in choosing the winning display in each class.
5. The contestant should indicate the floor area of his window at the time of submitting his entry.
6. One photograph of the window and a letter of explanation must be received by Edison Electric Institute, 420 Lexington Avenue, New York City, on or before June 10, 1935.

It will be noted that the window must feature the products of one of the contributing manufacturers to the program. The list is as follows:

General Electric Company
Hamilton-Beach Mfg. Company
Knapp-Monarch Company
Landers, Frary & Clark
Manning-Bowman & Co.
Proctor & Schwartz Electric Co.
Robeson Rochester Corporation
The Silex Company
Waters-Genter Company
Westinghouse Electric & Mfg. Co.
Swartzbaugh Manufacturing Co.
American Electrical Heater Co.

The interest and participation of all utility companies are urgently requested by the Electrical Housewares Committee.

H. P. J. STEINMETZ, Chairman of the Sales Committee, is expecting a large and representative attendance of utility men and manufacturers at the Second Annual Sales Conference to be held at Edgewater Beach Hotel, Chicago, on April 24 and 25. There will be a full day and a half of presentations on subjects that are foremost in the minds of commercial men at this time. The second afternoon will be devoted to a meeting of the Sales Committee with reports of the Committee Chairmen and general discussion. A feature of the Program will be an address on the Wheeler-Rayburn Bill by Mr. B. F. Weadock, Vice President and Managing Director, Edison Electric Institute, at a formal luncheon to be held the first day of the Conference.

This same week in Chicago, meetings have been called by Julius Daniels, Chairman of the Lighting Sales Committee, P. H. Powers, Chairman of the Rural Sales Committee, and W. H. Sammis, Chairman of the Industrial Power & Heating Committee.

P. H. POWERS, Chairman of the Electric Water Systems Council, held an Executive Committee meeting of the Council on March 10th at Chicago, at which promotional plans for the balance of the year in connection with the Running Water Program were laid out. The new Broadside developed by the Council is an attractive and effective mailing piece. It ties in the purchase of water systems with the Better Housing Program.

It will be recalled that insured loans are obtainable for installing a water system and also for drilling a well if required. Every utility company that is serving rural and semi-rural communities can use these Broadsides to their advantage. The prices are $20.50 per thousand and $19.50 in lots of 2,000 and more. A limited number of the Broadsides used last Fall are now available at $10.50 per thousand.

Attention
COMMERCIAL MEN

On to Chicago for the General Sales Conference of Edison Electric Institute, Edgewater Beach Hotel, Chicago, April 24 and 25.

Hear leaders of our industry discuss such subjects as:

Sales versus rental in promotion of cooking and water heating.
Methods of increasing consumption of minimum bill customers.
Objective rates and their influence on more business.
The new Light Prescribing technique.
Some lessons learned through intensive research among utility customers.
Financing the consumer — a major industry problem.
Does dealer cooperation work—Does it pay in sales?
Sales problems under government competition.
Possibilities in rural electrification.
Manufacturer participation in load building plans.
Should the small appliance market be taken for granted?
The Better Housing Program and the electrical industry.

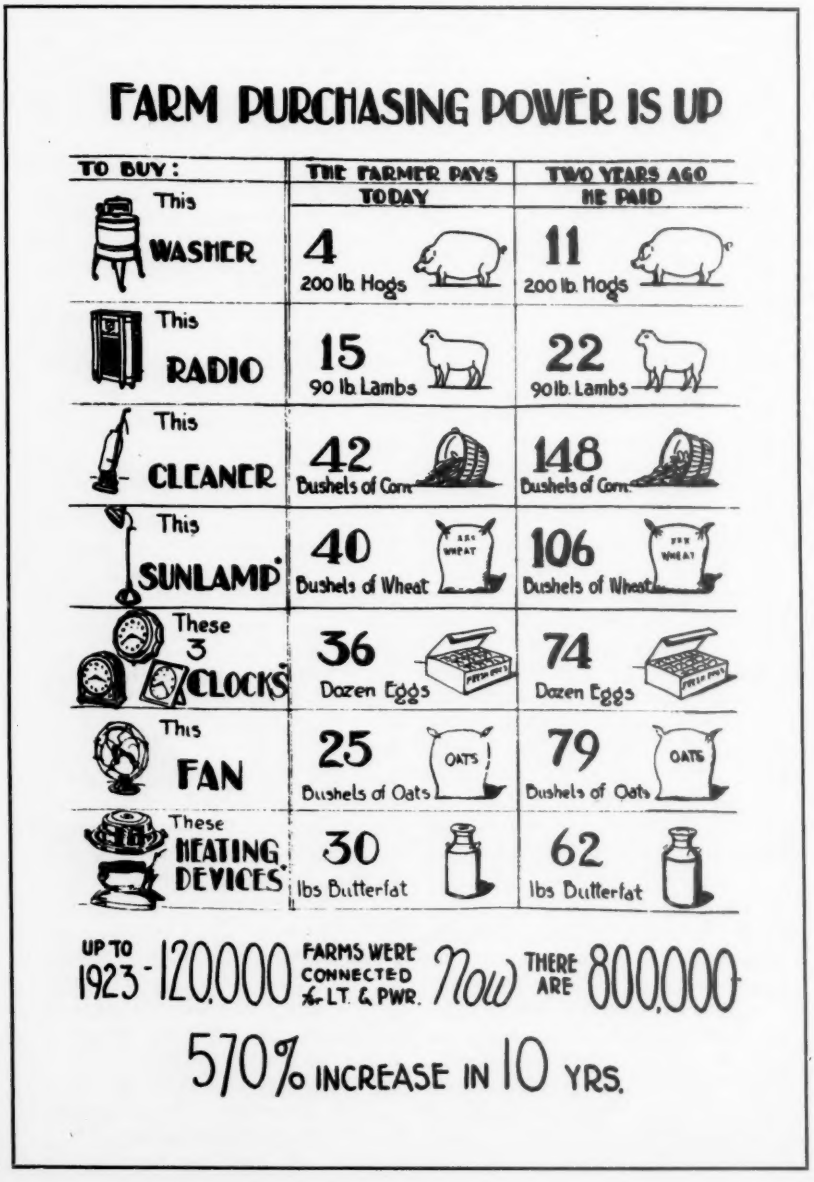
Ask your Chief Executive if new ideas, general information, and interchange of experiences obtained will not be helpful in local sales and promotional work.

The General Conference will be April 24 and 25. The Sales Committee will meet the afternoon of April 25.

Special low hotel rates are being offered. Most railroads are offering low travel rates these days.

Chairman H. P. J. Steinmetz and the entire Sales Committee urge a large attendance.

OLD man "Depression" brought back the old days of barter. There are soothsayers that think we will return to the old barter days. If so, Ray Turnbull, Assistant Manager of Sales, Merchandise Department, General Electric Company, is ready to go, and has visualized the increase in farm purchasing power in a chart which is reproduced here. Mr. Turnbull has indicated to the purchaser of appliances in rural districts the advantages in buying electrical appliances now in terms of the barter system. The appliances selected have a special appeal in the farm home. The chart will indicate to dealers and utilities in farm territory the "Buy Now" opportunity.



THE Executive Committee of the Better Light-Better Sight Bureau met at Chicago at the call of M. E. Skinner on March 25th. Inventory of accomplishment indicated fruitful results from this outstanding promotional activity. Reports from approximately 200 utilities representing almost half of the electric consumers of the country showed that 117 now have Lighting Departments. Most of these have an experienced Lighting Director in charge.

One hundred companies report that they had a total of 480 women assigned exclusively to home lighting work and 154 companies have a total of 752 lighting specialists exclusively on lighting.

Local eyesight specialists are active in local cooperative work. In the territories served by 49 utilities there is record of 1802 eyesight specialists actively participating, and 479 paint dealers. A few thousand electrical retailers, including department stores, contractor dealers, furniture and hardware stores, are lined up in this surge of interest in better illumination for all classes of buildings, and the protection of vision.

There are limitations in arriving at a fair estimate of increased lighting load, but a check-up on 57 utilities, representing approximately 32 per cent of the total meters, report an estimated increased lighting load of 159,000 kilowatts, including domestic, commercial, industrial and street lighting.

The activities of the optical industry and the paint industry in connection with this Better Light-Better Sight movement are expanding, and future results can be viewed with much optimism. And what is most gratifying, is the arresting of the continued downward trend of the curve of estimated energy output in the home for lighting purposes. We must resist with vigor the ever-increasing tendency of our customers to express thrift by the familiar statement—"Turn off that light."

THE Kitchen Modernizing Program which has been under discussion for several weeks has not been formulated because of unavoidable delays. In normal operation of the electrified home, kitchen equipment will account for a substantial percentage of energy output. The attention of the homemaker is being directed to better conditions in the home workshop through articles in national magazines. Two of the largest manufacturers of electrical equipment have Kitchen Planning Divisions. It is opportune that a coordinated activity for promoting the All-Electric Kitchen be started.

The Edison Electric Institute cooperating with the Federal Housing Administration is producing a four-reel sound film for the promotion of the electrification of the kitchen. It is entitled "The Courage of Kay."

The scenario is completed, and it is expected that actual production at Hollywood will start on or before the first of May.

Films will be available at low cost for purchase and for rental. It is at present contemplated to supply 16 mm. films, sound and silent, and also 35 mm., sound, for showing in motion picture theaters.

Type A Single-Phase Metering Installations

Meter-Switch-Fuse Sequence—A Review of Present Practices in the Field

By W. C. Wagner
Philadelphia Electric Company

THE type A single-phase watthour meter, being very similar in mounting dimensions to previous types of bottom-connected meters, is adaptable to practically all modern types of metal meter mountings and service entrance equipment. It can also be readily adapted to most of the older types of such equipment by minor changes, such as a rearrangement of the mounting holes and endwalls of the old equipment. Practically all companies who are using bottom-connected meters now have some suitable and economical method of installing them which can be readily adapted to the type A meter. Because of this similarity between the type A meter and the previous types of bottom-connected meters, it is generally felt that no recommendations definitely proposing a single standard of installing this type of meter seem to be necessary or desirable at this time.

With these thoughts in mind, this paper has been prepared as a review of present practices in this field. It includes a brief review of the recent standardization of single-phase meters, the development of the meter-switch-fuse sequence of service-entrance connections and various general ideas for utilizing this sequence in practice in connection with the type A meter.

Single-Phase Meter Standardization

During the past year the Subcommittee on Meter Mountings of the Electrical Equipment Committee, E. E. I., developed a set of requirements for single-phase watthour meters in an effort to bring about simplification and economies in both metering and installation practices. As a result of this effort, the manufacturers proposed the standardization of two distinct types of single-phase meters, which have since been agreed upon as standard. These two types are now available from all manufacturers and may be described as follows:

Type A—a single-phase meter similar to and interchangeable with previous types of bottom-connected meters.

Type S—a socket or detachable type of single-phase meter.

Many companies feel that the adoption of two standard types instead of one is very desirable.

Referring to the type A meter, there would undoubtedly still exist an appreciable need for some form of bottom-connected meter interchangeable and similar to those used for the past twenty years. Therefore, it is felt that very definite advantages have been gained by having the housing and terminal connections of this type of meter standardized among all of the manufacturers.

Meter-Switch-Fuse Sequence

The meter-switch-fuse sequence method of service entrance connections was initially recognized in the 1931 edition of the National Electrical Code. Since that time, its adoption as standard service entrance practice by utility companies has been progressing steadily. Operating experience with this type of installation has proved to be entirely satisfactory.

At the present time a few companies have a program under way to remove the service fuses from existing 30-ampere single-phase installations, leaving the customer's switch and fuses as the sole protection for the installation. This represents a conversion of each of these installations to the new sequence method. One of these companies, at the time the service fuses are removed, is attaching a small metal tag to the meter cabinet containing the following wording:

"DO NOT BREAK SEAL—THIS BOX DOES NOT CONTAIN FUSES," and it is apparently working out satisfactorily.

The statement of one utility company which is at present revising its service entrance regulations to require the use of the new sequence method for all new and reconstructed installations is quoted as follows:

"The new-sequence method of metering has so far been used only to a limited extent on our system. It has been applied for trial on new and reconstructed installations in a few restricted portions of our properties, and on all installations where tampering by customers has been definitely proved. In revised regulations for electric service soon to be issued, the use of new-sequence connections is to be mandatory for all new and reconstructed installations. The equipment, other than the meter, is installed at the customers' expense; but the meter and auxiliary enclosures and test facilities are owned by the Company."

"A primary obstacle to the more prevalent use of new sequence by our company was the inability to secure economical standardized mounting and test facilities for convenient application with meters already owned as well as for any new types. In view of this rather limited application of new sequence, the advantages of its use have not been as evident as may be desirable. However, indications of the benefits of new-sequence connections have been sufficiently clear to cause its adoption for use on all new and reconstructed installations as soon as satisfactory equipment was available. Although of short duration, such experience as we have had with the new method has been entirely satisfactory."

Because of local inspection regulations or ordinances, some utility companies are still not permitted to use the meter-switch-fuse sequence method.

Some of those companies have adopted the switch-meter-fuse sequence while many others are still using the switch-fuse-meter sequence. Neither of these latter two sequences are considered satisfactory because the desired isolation of unmetered live parts from other equipment to which the customer may normally require access cannot be readily accomplished with either of these methods. This represents a very unfortunate situation in the light of the satisfactory field experience which has been gained with the meter-switch-fuse sequence.

At present, the National Electrical Code permits the use of the meter-switch-fuse sequence on all installations requiring service equipment in capacities up to and including 100 amperes per phase operating on circuits having not over 300 volts between conductors. The field experience which has been gained indicates that a further liberalization of the code requirements should permit the use of this sequence on all alternating current secondary self-contained and current transformer metering installations without a current capacity limitation.

Utility companies which have not as yet used the meter-switch-fuse sequence method (and are not restricted from

doing so by local regulations) should inquire into the possibilities of any benefits that may be derived from its adoption to their respective systems. If a fairly universal acceptance of this method of service-entrance connections is secured, there should be a tendency toward a more rapid development of simple and economical service-entrance equipment.

Meter Mountings and Service-Entrance Equipment

While the type A meter can be used with the older switch-fuse-meter sequence equipment and also with the switch-meter-fuse sequence equipment, this presentation is only intended to cover, in a general way, equipment and practices employing the meter-switch-fuse sequence method.

Indoor Installations

On indoor single and small group installations (one to four meters), one method of installation consists of a small sealable metal box (equipped with the proper meter endwall) inserted between the service supply and the customer's service switch and fuses. In another form of equipment the desired isolation of the service and meter connections is

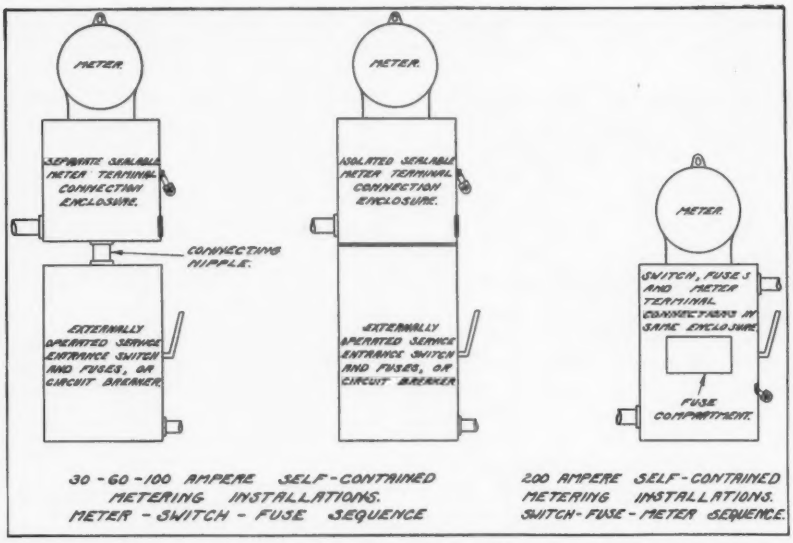

METER.
SEPARATE SEALABLE METER TERMINAL CONNECTION ENCLOSURE.
CONNECTING NIPPLE.
EXTERNALLY OPERATED SERVICE ENTRANCE SWITCH AND FUSES, OR CIRCUIT BREAKER.
METER.
ISOLATED SEALABLE METER TERMINAL CONNECTION ENCLOSURE.
EXTERNALLY OPERATED SERVICE ENTRANCE SWITCH AND FUSES, OR CIRCUIT BREAKER
METER.
SWITCH, FUSES AND METER TERMINAL CONNECTORS IN SAME ENCLOSURE
FUSE COMPARTMENT.
30-60-100 AMPERE SELF-CONTAINED METERING INSTALLATIONS. METER-SWITCH-FUSE SEQUENCE
200 AMPERE SELF-CONTAINED METERING INSTALLATIONS. SWITCH-FUSE-METER SEQUENCE.

Fig. 1—Various types of equipment required for self-contained meter installations.
Figures are referred to in Appendices A and B

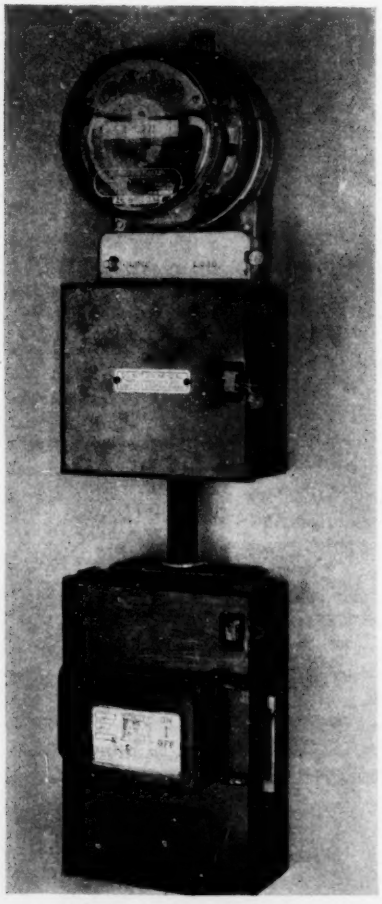


Fig. 2—Separate sealable connection box which on single installation is nippled to the service switch box.

Fig. 3—Combined service-entrance device in which the isolated sealable compartment is an integral part of the service-entrance equipment.

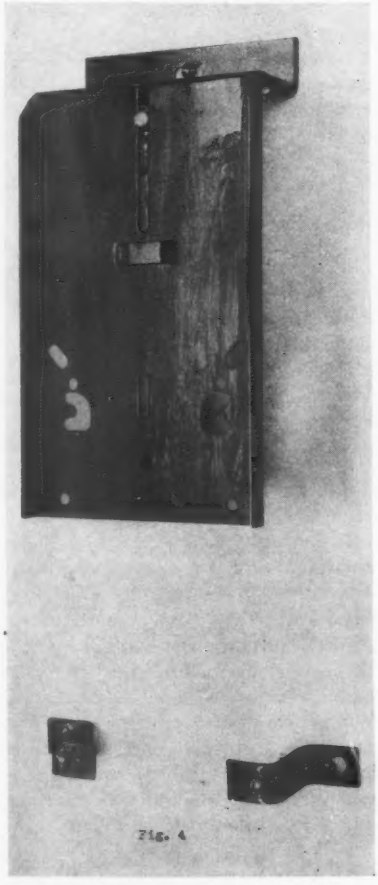


Fig. 4—Metal meter mounting plate and the angle feet which accommodates all types of bottom-connected meters.

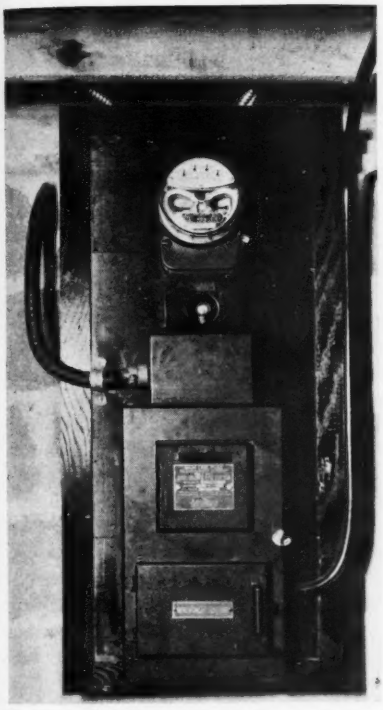


Fig. 5—Single watthour meter installation.

Fig. 6—Single installation with the new type channel.

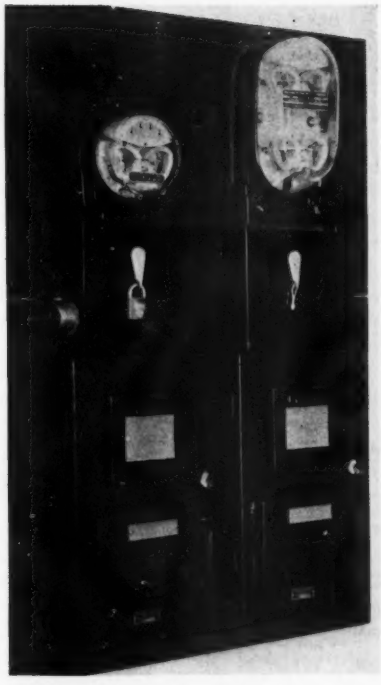


Fig. 7—Multiple installation.

obtained by including an isolated sealed compartment, in the place of the separate sealable metal box noted above, as an integral part of the service-entrance equipment. This separate box or the isolated compartment can be used to house a terminal connection block for the service and meter connections, or in some cases the connection block has been eliminated entirely and the service wires and load wires connected directly to the meter.

By utilizing other recent developments to be used with the type A meter, it can be converted to either a "B" meter or a "C" meter. The "B" meter is essentially the same as the type "A" except that there has been added an additional terminal connection block to facilitate connection, disconnection and testing of the meter. This meter can be used with the separate boxes or isolated compartment mentioned above, or it can be directly connected to a small box which the meter manufacturers have developed for connecting it directly to the service-entrance conductors. In this case, only one cover is needed for both the terminal connections in the meter and the small box. The C meter has an extra enclosing case surrounding the entire meter except the front part of the glass meter cover, which extends through an opening in the metal cover.

For large-grouped installations, in general, the practice is to use a sealed wiring trough arrangement for the service conductors. In such cases a small sealable box, similar to the one mentioned above, can be nippled to the trough for each meter or the type "B" meter may be used and mounted directly over the trough either with or without the small type "B" connection box mentioned above.

Outdoor Installations

In general, for single and grouped outdoor installations a complete enclosure of rust-resisting material is used, which totally encloses the entire meter. The type "C" meter is also designed for outdoor use. Both the type "A" and type "B" meters when equipped with the auxiliary connection box may also be used outdoors when installed in protected locations.

Conclusion

Of course, these methods will vary slightly in some cases, and greatly in others, depending upon local conditions and company policies. In some cases, the customer is required to furnish and install all of the equipment and wiring connections except the meter itself, while in others the utility company furnishes the necessary auxiliary devices and the customer's contractor installs them. As an illustration of the two practices, two appendices have been included. Appendix A covers the practices of a company which requires the customer to furnish and install all of the equipment. Appendix B covers the practices of a company which furnishes the auxiliary equipment which is installed by the customer's contractor.

APPENDIX A

Excerpts from the Service Regulations of One Company Which Requires the Customer to Furnish All Equipment for Metering Installations.

Requirements for 115-230-Volt Self-Contained Meter Installations

On all self-contained meter installations requiring service-entrance equipment in capacities up to and including 100 amperes, the equipment shall be so arranged that the meter can be installed, and the necessary service and meter connections made *ahead* of the service switch and fuses or circuit breaker.

A sealable metal enclosure equipped with a terminal connection block, of a

type approved by the company, inserted between the service supply and the service switch and fuses or circuit breaker, will be required for each meter installation. All unnecessary openings in these devices shall be adequately closed to prevent unauthorized access to the interior of the enclosure. The enclosure may be either an isolated sealable compartment of a combination meter switch assembly or a separate sealable box nippled to an externally operated enclosed fusible switch or manually operated enclosed circuit breaker.

On all self-contained meter installations requiring service-entrance equipment in excess of 100-ampere capacity, the equipment shall be so arranged that the meter can be installed, and the necessary service and meter connections made *after* the service switch and fuses.

The above types of equipment are intended for use with self-contained meters. On installations exceeding a connected load of 100 amperes per phase, the contractor shall ascertain, from the local operating division of the company, whether self-contained or current transformer metering will be used before starting the work.

Meter supports may be constructed of either lumber or metal. Where lumber is used, it shall be soft, clear of knots and cracks, at least ⅞ in. thick and painted with a good grade of paint. Where metal is used, it shall be arranged to accommodate all types of self-contained meters which may be used with the equipment to which it is attached. All meter supports shall be erected level and plumb, and shall be rigidly fastened to the wall with at least 1-in. air space between the support and the wall.

In all cases the service-entrance equipment shall be located as close as practicable to the point of service entrance to the building, and shall be firmly and properly secured to the surface upon which it is mounted. Wooden plugs driven into holes in masonry shall not be depended upon for such security.

In order to give a general description of the equipment being used in accordance with this company's regulations, the following drawings and photographs have been included.

Fig. 1 shows generally the various types of equipment required for self-contained meter installations.

Fig. 2 shows separate sealable connection box which on single installation is nippled to the service switch box. On grouped installation it can be nippled directly to a sealed trough containing the service conductors.

Fig. 3 shows a combined service-entrance device in which the isolated sealable compartment is an integral part of the service-entrance equipment.

Fig. 4 shows a metal meter mounting plate and the angle feet which accommodates all types of bottom-connected meters. These mounting plates can be used directly with the separate box shown in Fig. 2 or with the combined device shown in Fig. 3. When so used, these devices may be mounted directly on any wall without requiring additional wood meterboards.

APPENDIX B

Watthour Meter Installation Methods of One Company Which Furnishes the Auxiliary Devices for All Metering Installations

The methods of installing watthour meters and meter protective equipments now in use on this company's system were inaugurated Oct. 1, 1931. The design adopted at that time introduced a standard practice for the entire system, taking advantage of the meter-switch-fuse sequence for single-phase installations. While slight changes in detail have been made from time to time, the essentials of the system then established have been retained.

Single-phase, two- and three-wire installations up to 100-ampere capacity consist of the channel form of service equipment. The service-entrance cable or conduit terminates in a short service channel having removable side walls and cover. Above this is mounted a bakelite test block and then the watthour meter. Below the channel is located the load switch and distribution fuses. Fig. 5 shows a single watthour meter installation of this type.

When a multiple installation of two or more meters is required, one side wall is removed from the short-service channel, a long-service channel is added, and the spare side wall placed at the end of the long channel. The test block and watthour meter are installed, the same as in the case of the single-meter installation. Large installations of this type are divided into groups, each group being fed by a branch circuit to insure ample service-wire capacity for all meters.

The use of two-element meters to measure three-wire service from a three-phase, four-wire network necessitatd a modification of the previously described equipment. Inasmuch as the change in design effected a material economy, it is now used for both single and two-element meters, and supersedes the equipment previously described but is interchangeable with the same as regards banking and test devices. The same test equipment and tools are applicable to the test blocks in both cases. Figs. 6 and 7 show the newer type of channel-test cabinet used in conjunction with several different types of service-entrance equipment.

The Engineer and the Accident Prevention Program

(Continued from page 116)

society protects itself against its criminal and mentally deficient elements.

Perhaps we might liken the responsive and cooperative group of workers to the good ground which, when the accident prevention thought falls upon it, as did the seed in the parable of old, brings forth fruit many fold, and experience has shown this to be true. And so it is in the process of constantly increasing the area over which good ground may be found that we find an opportunity presenting itself to the engineer to aid in the effort to enrich and strengthen the soil in which the supervisory forces must work to produce results.

Suppose, then, that the engineer's relation to the matter is viewed from the angle of example or leadership. There is no influence that is as strong as that created in the minds of men by the actions, based on constructive thinking, of those in whom they have confidence, and which is increased greatly if such individuals have that personal quality which induces others to emulate them in all things in which they show interest. Apathetic attitudes in such matters as this are deadly, but the enthusiastic support by an engineer of the safety engineering work of his associates on construction and operation, and the evidence of his sincerity in the conduct of his own work, will do more to promote the efforts of the safety engineer than almost anything else. It is the old story of precept versus example. The safety engineer, by virtue of his very duty, must be placed always in the position of the teacher, constantly calling the at-

(Continued on page 128)

Last Year's Electric Operations

An Abstract of the More Important Parts of E.E.I. Statistical Bulletin No. 2

Statistical Bulletin No. 2, covering the electric light and power industry during 1934, is published this month by the Institute. The Bulletin contains 40 pages, with 6 charts and 35 tables in addition to textual matter—among the new additions this year are 6 tables on general farm statistics, prompted by the increasing interest in rural electrification. Price to members, 30c; non-members, 75c; foreign, 85c.

The following constitutes an abstract of the more important parts of the Bulletin.

EXCEPT for the effects of the textile strike, production of electricity during 1934 remained fairly regular throughout the year at somewhat higher levels than those prevailing during the two previous years. A considerable seasonal improvement took place during the last two months of 1934, which was carried forward into the first quarter of 1935.

Total sales of electricity to all classes of consumers aggregated 70,781,780,000 kwhr in 1934, a gain of 7.6 per cent as compared with 1933. This, however, was still 6 per cent below the total of 1929, when the industry recorded the maximum sales volume in its history.

With the exception of street lighting and miscellaneous municipal sales, which still continued to reflect the effects of municipal economies, all classes of consumers used more electricity during the year. With an increase of 9.5 per cent over 1933, sales of industrial power continued the large gain registered during 1933, while domestic service grew by 7.0 per cent and retail commercial business gained 5.4 per cent in volume.

Gain in Number of Consumers Coming to an End

A further growth in the number of consumers took place in 1934, reaching a new high figure of 24,808,537 and completely regaining all the losses which took place during the most severe part of the depression. There are indications that almost all of the families which "doubled-up" during 1931 and 1932 have now returned to their original status and this was reflected in an increase of 480,000 domestic customers during the year. The fact, however, that this increase tapered off during the last quarter suggested the possibility that further gains in the number of consumers must from now on depend either upon new residential building or else upon the further extension of utility lines into hitherto unserved rural areas. This latter will, in turn, involve financing operations of considerable magnitude.

Construction Work at New Low Levels

Based upon preliminary estimates, the amount of construction in the electric light and power industry in 1934 dropped to $100,000,000, the lowest level since 1908. This compared with an average annual expenditure for new construction of $750,000,000 by this industry during the decade from 1920 to 1930. Present indications are that the total in 1935 for private companies will not be substantially different from 1934.

These figures relate to private companies and municipal plants. No detailed figures are available for all the various Federal projects, but an estimate for 1934 may be made as follows:

Expenditures During Calender Year 1934
Federal Government Projects

Boulder Dam	$24,768,412
T.V.A.	25,754,031*
All Other** about	9,477,577
Total, about	$60,000,000

* Includes soil erosion, reforestation, etc., in addition to electricity.

** Bonneville, Grand Coulee, Caspar-Alcova, and various minor projects.

Generating Capacity Still Shows Large Excess Over Requirements

Installed generating capacity showed a net decrease during 1934. Due to the retirement of several large plants there was a decline of 253,400 kw in steam power. Because of the abandonment of a number of very small and antiquated water power plants and to the reclassification of others as "manufacturing plants" rather than public utilities, the installed hydroelectric capacity declined during the year by 48,860 kw. These decreases were offset, in part, by an increase of 50,800 kw in Diesel engines, so that the total change for the year was a net decline of 252,445 kw in power plant capacity.

Aside from the uncertainties of business in general and of the effects of the political attacks on the electric light and power industry in particular, an important factor in the practical stagnation of new electric construction has been the fact that there has existed during the past year an excess of plants of all kinds, as illustrated by the present surplus of generating capacity, over and above the usual reserves, which was at the end of 1934 about 5,000,000 kw (or 17 per cent) for the United States as a whole and ranging as high as 50 per cent in some areas.

In view of statements of "power shortage" about to take place in the United States, the figures of the peak weeks of 1934 and 1929 are shown in the table below as a matter of statistical record.

On the basis of the heaviest week of December, 1929, the total which could be produced from present equipment is approximately 2,092,000,000 kwhr per week, or 17 per cent more than was required during the comparable week of 1934. As indicated in the table, if present plants were operated at the rate prevailing in December, 1929 (at which time there was even then a sufficient reserve capacity in excess of current requirements), the 1934 production could have been turned out by only 28,400,000 kw, leaving 4,842,000,000 kw in reserve for future demand. These figures,

PEAK WEEKS OF 1929 AND 1934

Date	Total Output (Kwhr *)	Capacity (kw)	Capacity Factor
Week of December 21st, 1929	1,860,021,000	29,560,000	37.4%
Week of December 22nd, 1934	1,787,936,000	33,242,000	32.0%
	Decrease 3.9%	Increase 12.5%	Decrease 14.4%

* Generated, plus purchased from industrial plants and imported from Canada, less company use. This is the figure called "total energy for distribution" in the monthly reports (Table H) and "output" in the weekly report (Table J).

Total present capacity Kw	33,242,000
Total capacity required to produce 1,787,936,000 kwhr per week at 1929 rate of operation	28,400,000
Present Excess Capacity (17% of 28,400,000) kw	4,842,000

of course, are overall totals for the country as a whole. Individual locations would probably show wide differences, ranging from a close approach to 1929 loadings in some sections to a large excess in others.

Little Further Increase in Fuel Efficiency

It is evident that for the industry as a whole, the efficiency in the use of fuel has about reached its limit under present conditions. Judging from the performance of some of the individual stations it is, however, quite possible that the additional increases in efficiency which have been made possible by the engineering advances of the past five years only await the further modernization of plants and that if the former incentives to the profitable conduct of business were once more restored, the trend towards still more economical operation would again be resumed.

During the year 1934, the electric light and power industry consumed approximately 37,500,000 tons of coal (or its equivalent in other fuels) at a total cost of about $135,000,000.

Generation of Electricity and Present Trend of Output

The generation of electricity by the electric light and power industry in 1934 was 84,532,153,000 kwhr, which was 5,273,066,000 kwhr (or 6.7 per cent) more than that in 1933. Due largely to extremely low water in New York State reservoirs during the summer, a substantial increase in importations of electricity from Canada took place.

All generating plants taken together, the electric light and power industry operated at an average of 28.9 per cent of installed capacity for the year as a whole, as compared with 26.9 per cent for 1933 and 26.3 per cent for 1932. In 1929, however, the ratio was 36.4 per cent. The "capacity factor" of fuel-using plants increased from 22.1 per cent in 1933 to 24.9 per cent in 1934. At the same time, the "capacity factor" of hydroelectric plants was impaired, in some of the northern states, by the widespread drought and for the country as a whole it declined to 39.7 per cent in 1934 from the high record figure of 40.3 per cent established the year before.

In several sections of the United States, the decline in water power production reached new low levels and once more emphasized the necessity for interconnected systems and fuel-burning power houses for the maintenance of an uninterrupted supply of energy. The following figures show the "capacity factors" of water power plants in the areas most affected by last year's drought:

Geographic Region	Average 12 month Ended Dec. 31, 1934	Lowest, 12 months Ending with
East North Central States	33.3%	August —29.4%
West North Central States	29.2%	September—26.1%
West South Central States	17.4%	July —16.0%

Trend of Costs to the Average Consumer

The average receipts per kilowatt-hour sold to the domestic class of consumers showed a continuation of the same decreasing trend which has persisted over a long term of years, the average revenue per kilowatt-hour sold to these customers declining from 5.49 cents in 1933 to 5.30 cents in 1934. This represents a drop of 3.5 per cent, which is the same as the average of the preceding eight years.

During the second quarter of 1934, further sharp reductions were evident in the unit prices received for industrial power, largely reflecting the greatly increased manufacturing activity of that period. These reductions more than offset the relatively considerable increases during the second half of the year, primarily the result of the higher costs of fuel. Revenues received per kilowatt-hour sold for large (wholesale) light and power averaged 1.34 cents for the year 1934 as a whole, although they ranged from a post-war record low of 1.292 cents for the month of April to a high point of 1.392 cents for the month of September when the textile strike reduced the volume of industrial output to a marked degree.

Lower Rates Produce Lower Revenues

Compared with pre-war figures the average unit price of domestic electricity at the end of 1934 was 38 per cent below the 1913 levels, while the cost of living index of the U. S. Bureau of Labor Statistics at the end of 1934 had risen to 39 per cent above the 1913 average. While the cost of living has been going up, rates have been coming down. During the past three years, rates have been decreasing faster than the growth of the killowatt-hours which these reductions are supposed to stimulate, with the result that the industry is now obtaining lower gross revenues from an increased volume of sales.

In 1931 the average unit price for domestic service was 5.78 cents per kwhr and the average annual use per consumer was 584 kwhr. In 1934, the average unit price was 5.30 cents per kwhr and the average annual use 631 kwhr. The consumer's average annual bill declined from $33.76 in 1931 to $33.44 in 1934.

Growth of the Tax Burden

In 1934 the electric light and power industry felt the full burden of the additional sales taxes, the taxes on gross revenues imposed by the legislatures of many states and the 3 per cent Federal excise tax. Factors offsetting these increases were decreased income taxes because of much reduced incomes and some decreases in local real estate taxes. The result was a rise in taxes to the new high figure of $245,000,000, representing a net increase of $30,000,000 over the year before.

Up to 1917, taxes increased at much the same rate as output and physical property. In the decade immediately following the war, however, taxes increased at a much faster pace, and while this rate of increase slackened somewhat during the period 1927-1932, it has now begun to rise again faster than ever before.

During the depression the total of tax payments has steadily been rising, while gross revenues have been falling, so that the proportion of revenues paid out in taxes reflects the cumulative burden of two highly unfavorable factors.

Rise in Food Prices Alone During the Past 12 Months Has Been Greater Than the Entire Cost of Domestic Electric Service

Between March, 1933 and March, 1934, the cost of food rose nearly 11 per cent. Applied to the $7,500,000,000 retail sales of all items of food in the United States, this means an increase at the rate of some $800,000,000 per year which will be paid out of the householder's shrinking purse as the result of the combined consequences of the wilful destruction of crops and animals, last year's drought, and the price-raising effects of the NRA. This is $122,000,000 more than the total bill of $678,000,000 for all domestic electric service in the United States in 1934.

INDUSTRIAL HEATING POINTERS

Items contributed this month by S. Bennis, The New York Edison Co.

Electric Furnace Successful in Precious Metal Melting

I. Stern & Company, Inc., of New York City, manufacturers of gold, platinum, and silver alloys used in dentistry and the jewelry industry recently installed two electric furnaces for melting these alloys.

The furnaces are manufactured by C. I. Hayes, Inc., of Providence, R. I. Temperatures up to 2700 deg. F are obtainable. The heating chamber is 10 in. deep with top opening 7 in. by 7 in. Six Globar heating elements are used, having a connected load of 17 kw at 220 volts.

The control equipment consists of Leeds & Northrup Micromax indicating temperature controller actuated by a thermocouple placed in the heating chamber. This instrument, together with the automatic switch which it operates, is mounted on the wall at a convenient height so as to facilitate reading and adjusting the temperature. Any predetermined temperature up to the maximum of 2700 deg. F. is automatically maintained within ± 10 deg. F, thus allowing the operator to concentrate entirely on the melting down and pouring of the metal.

The common method of securing the variable voltage necessary for prolonging the useful life of the Globar elements is by a transformer with taps. The terminal voltage of the furnace is gradually increased to compensate for the increase in resistance during the life of the units. However, for this particular installation, an input regulator will be used which will apply line voltage to the furnace for a period of time which is variable from one second to four seconds on a four-second cycle of operation. By this method of operation the power input is limited to a safe value. This necessitates the use of Globars which will give the required input on less than line voltage so as to secure a reasonable life of operation for the element. The furnace has not been in operation for a sufficient length of time to indicate what the life of the elements might be.

The installation of these furnaces was based entirely on the results obtained with a 9 kw experimental furnace previously installed. While electricity as a fuel is higher in cost than other forms of heat, the results of tests on the small furnace show a 100 per cent increase in melting speed, elimination of roar and diffused heat, plus accurate temperature control resulting in increased production, better quality ingots, a quiet and comfortable melting room with the melter working under far less mental and physical strain. All these factors will more than offset any increase in fuel costs.

The alloys melted in this furnace have melting points between 1200 deg. and 2700 deg. F with a usual working range of 2000 deg. to 2400 deg. F. A No. 4 graphite crucible capacity approximately 100 troy ounces of gold alloy or 7 lb. average is melted in approximately 15 minutes with the furnace at operating temperature. About 30 minutes is required to bring the furnace from room temperature to 2500 deg. F.

Hydraulic Matrix Moulding Press Electrically Heated

The R. Hoe & Company, Inc., hydraulic matrix molding press used by The Cresset Company, Inc., New York City, is equipped with electric heat for molding matrix forms.

The heating equipment consists of 42-600-watt strip heaters mounted on the underside of the moving plate.

Temperature is held constant at 200 deg. F and within a limit of ± 5 deg. F by a Bristol Temperature Controller operating a magnetic switch. The press also has a double throw switch for operating the heaters on high or low heat, 25 kw and 6 kw respectively.

The evenly distributed heat over the entire surface of the matrix is important in forming a matrix. Electric heat was the only heat to accomplish this to the satisfaction of the user.

The matrix is used as a mold for the stereotype metal from which the plate for printing is cast.

Printing Trade Prevents Offset by the Use of a Reflector Type Electric Heater

A great many printers are solving the problem of offset, slip sheeting, and slow ink set by the installation of a reflecting type electric heater to their presses.

The Acme Printing Appliance Company of Chicago, Ill., has designed this heater so that it can be applied to any make press. The Globar non-metallic heating element projects an infra-red ray of high intensity from a polished aluminum reflector, the heat striking the freshly printed sheet, sets the ink quickly, keeps the pile warm, and prevents offset.

Celluloid Button Manufacturer Guaranteed Against Fire Hazard By Use of Electric Heat

Electric heat has proved to be a safe medium of heat in the celluloid button plant of the Berkman Button Company, located in New York City.

After the celluloid button disks are stamped out they must be heated and brought to a degree of softness before placed in the punch press to be molded and clamped to a button backer.

Twenty 360-watt hot plates are used in this plant for the softening process. The plates always remain at a constant temperature, with the heat evenly distributed over the plate surface.

The elimination of fire hazard was alone a factor to warrant the use of electric heat.

Steam Heated Oven Converted to Electric Heat

The Electro Chemical Engraving Corp., New York City, specializing in the application of all types of metal finishes, has recently changed over an oven used for printing and lacquer drying from steam to electric heat.

When in operation it is loaded with movable racks containing metal plates. The work consists of either zinc, aluminum, copper, brass or steel sheets, all with various designs and finishes to suit the purpose for which they are intended. As an indication of the wide field of application, the products of this firm range from electric meter dials and clock faces, on through all types of name plates, trademarks, and more recently beer trays in modern designs.

Electric heat has superseded steam heat in this oven, the only change required being the installation of four electric heaters. There is a 5-kw heater installed in each corner of the oven. Total rating 20 kw.

When operating on steam the maxi-

mum temperature obtainable was 125 deg. F and it required three hours per loading. With electric heat, temperatures up to 250 deg. F are obtainable with a reduction in time to 45 minutes per loading. Thus, the increase in speed, together with flexibility of operation, more than compensates for the extra cost of electric heat.

The loading dimensions of this oven are 14 ft. wide x 10 ft. deep x 8 ft. high. The walls are of hollow tile.

The heaters were fabricated and installed by the firm's electricians, using standard 400-watt strip heaters. This is only one of the many electric heating installations in this plant. Due to the safety of electric heat it has permitted the installation of simple heating units without the use of expensive construction and protective devices where possible explosive hazards exist from chemical and lacquer fumes such as are found in a plant of this nature.

Electric Heat in the Bookbinding Industry

Books, thousands of them, are printed and bound every day in the many bookbinding plants located in the city of New York. This industry was one of the first to recognize the advantages of electric heat, and many of the largest firms have all their process machinery equipped with electric heating units. It is a simple matter to install the standard electric unit heater to machinery where localized heat is required. Electric heat can be evenly distributed; it is clean, efficient and easy to control by inexpensive automatic control devices or by three heat manual control switches.

Large quantities of glue are used in the fabrication of books and it is most important that this glue be applied to the book at the proper temperature. Improperly heated glue loses its tensile strength and books become weak in structure. By the application of electric heat to the glue containers on case-makers, lining-up machines, gluing machines, and by having the glue cookers and the individual bench glue pots electrically heated, the glue is always maintained and can be applied at just the right temperature to guarantee its maximum strength.

The electrically heated embossing head used in power presses for embossing book covers has proved to be an ideal application for electric heat. This process requires a very even distribution of heat controlled at definite temperatures to properly heat the dies that make the imprint on book covers. Most other methods of heat application have proved costly because of the large number of rejects caused by improper heat distribution.

Electrically heated platens are used in Colt-Aromy presses for embossing book covers in color or gold leaf. Here again proper heat distribution is important for quality work. Many of the other machines used to fabricate complete books have the electric heater installed where localized heat is necessary. Smythe casing-in machines that form the back of the book cover have the back forming iron electrically heated. It pays to use electric heat.

Laboratory Installs Electric Steam Boiler

The W. M. Grosvenor Laboratories, Inc., 50 East 41st Street, New York, have installed a 4-kw portable steam boiler suitable for operation at steam pressures ranging from 0 up to and including 300 lb. per sq. in.

Provided with automatic control for maintaining any pressure in the range indicated above, the boiler requires a minimum of attention when in operation. The boiler is equipped with safety valve, water glass, pressure gage, and hand-operated feed water pump. This equipment, together with the automatic control features, is mounted on a carriage of sufficiently low construction to allow the boiler to be placed beneath the laboratory benches. This permits the use of the boiler in any part of the laboratory and shortens the length of steam connections between the boiler and the dryers.

The steam is used in drying apparatus suitably constructed for drying materials under pressure or vacuum and at the temperature corresponding to the steam pressure used.

A pressure controller, together with relays, is used to control the input to two 2-kw immersion units which supply heat to the boiler. The speed and efficiency of operation are indicated by the fact that steam can be produced at 300-lb. pressure, starting from room temperature, in 45 minutes.

From the above description it is evident that by the use of electric heat the laboratory has been provided with an efficient piece of apparatus of wide utility and use in a chemical laboratory.

This boiler was manufactured by the Commonwealth Electric & Manufacturing Co., Boston, Mass.

THAT 1937 "SHORTAGE"

(Continued from page 114)

Mr. Thomas. We take out pretty nearly 25 per cent.

Mr. May. Which would leave, then, a surplus of one million in 1936?

Mr. Thomas. *I think that that is what I told you, that if we had lots of water, and could use most of the hydro machines, it would make an addition of pretty nearly a million kilowatts.*

* * *

Mr. Montet. You base your estimate upon a probable dry year in the entire area that you first described, that is, the States of Tennessee, Alabama, and parts of Mississippi, Georgia, North and South Carolina and part of Virginia? You are assuming in reaching your conclusion that there would be a dry year in that entire area, are you not?

Mr. Thomas. I have taken the figures that the companies have given. I have not used any judgment. I have taken the figures that they have taken, what they call dependable—

Mr. Montet. But, in making your deduction in order to meet dry conditions, you assume that the entire area would be dry at one time?

Mr. Thomas. Yes.

Mr. Montet. That never has been a fact in the past, has it?

Mr. Thomas. I think so, but I am not able to tell you the actual periods.

Mr. Montet. I had hoped that you would; because you are testifying here, and you are testifying as to what would happen in a dry year, and I had hoped that you could give us detailed testimony and show us what year or years that entire area had gone what we call dry.

* * *

Mr. Montet. I would like to have your figures showing when there was what you call a dry year in the entire region, one that would support your conclusion that you must make the allowances that you are making for a dry year in the entire region.

Mr. Thomas. I cannot give you that figure.

Mr. Montet. I do not believe that that ever existed, either.

* * *

The Chairman. Industry must run in dry years as well as in wet years. Secondary power has a limited, if any, commercial value, has it not?

Mr. Thomas. That is correct.

Mr. May. Your entire statement, however, is based on assumptions. You start out with an assumption and your conclusions are reached on the basis of assumptions.

Mr. Thomas. I do not understand what you mean by that.

Mr. May. You said assuming dams to be completed at a certain time and assuming certain years were dry years and certain years were wet years, certain things would happen. In others words, you are making a hypothetical statement.

Mr. Thomas. *It is hypothetical to the extent that I pictured conditions that would exist if 1937 were a dry year. It is hypothetical to that extent.*

POWER SALES ITEMS

AIR CONDITIONING

"The Big Air Conditioning Market," by K. C. Porter. Electric Light & Power, February, 1935, p. 24. Bennett-Watts-Haywood Co., 360 North Michigan Avenue, Chicago, Ill., Publishers.

Business gained by the Commonwealth Edison Company, Chicago.

"What We Have Learned About Air Conditioning," by L. Grabensteder. Electric Light & Power, January, 1935, p. 40. Bennett-Watts-Haywood Co., 360 North Michigan Avenue, Chicago, Ill., Publishers.

Air conditioning installations in Cincinnati—1933, 1934.

"Total Installed Air Conditioning Tonnage Increases 21% in 1934." Heating, Piping & Air Conditioning, January 1935, p. 1. Kenney Publishing Co., 6 North Michigan Avenue, Chicago, Ill.

Figures for 13 cities show total installed tons of refrigeration for air conditioning increased during 1934 from 65,000 to 78,500 tons.

"Air Conditioning Rescues Industry From the Weather," by B. P. Fonda. Heating, Piping & Air Conditioning, January 1935, p. 12. Kenney Publishing Co., 6 North Michigan Avenue, Chicago, Ill.

Air conditioning system installed by the Waverly Press for control of air conditions in summer as well as in winter.

"Air Conditioning for Fruit Storage Plants." Electrical West, January, 1935, p. 28. McGraw-Hill Company of California, 883 Mission Street, San Francisco, California, Publishers.

Calculated costs for citrus plant installation to provide proper atmospheric conditions which will retard deterioration of fruit and prevent shrinkage and loss of weight.

"Power At Work in Industry." Electrical World, March 16, 1935, pp. 52-55. McGraw-Hill Publishing Co., Inc., 330 West 42nd Street, New York City.

This article describes the use of air conditioning in a cigar factory to duplicate temperature and humidity conditions of Cuba resulting in the recapturing of a market which was seriously depleted by the depression. Some of the benefits of air conditioning in a plant of the American Tobacco Company are listed as reduction in lost time, labor turnover, rejects, and increased production combined with more comfortable working conditions and increased efficiency of workers.

"Air Conditioning Gains in Georgia." Electrical World, March 16, 1935, p. 60. McGraw-Hill Publishing Co., Inc., 330 West 42nd Street, New York City.

The increase in consumption due to installation of air conditioning equipment during 1934 is estimated at 540,000 kw.-hrs. and an annual revenue of about $9,000 by the Georgia Power Company.

COMPETITIVE FUELS

"Competitive Fuels for Industrial Purposes," by A. M. Apmann. American Gas Journal, January, 1935, p. 15. American Gas Journal, Inc., Publishers, 53 Park Place, New York City.

Important factors to be considered when figuring costs.

DIESEL ENGINES

"Diesel Maintenance Cost Analysis," by P. M. Thayer. Power Plant Engineering, February, 1935, p. 97. Technical Publishing Company, 53 West Jackson Blvd., Chicago, Ill.

Not only should the engineer concern himself with the bookkeeping system but he should see that entries are properly made.

"Office Building Diesel Power Plant Pays for Itself and Shows Surplus." Diesel Power, March, 1935, p. 163. Business Journals, Inc., Publishers, 192 Lexington Avenue, New York City.

This article is a summary of the equipment installed in the now well-known 1 Park Avenue installation and operating cost for generating power in the office building for the year 1934. The operating cost shown considered only fuel cost, lubricating oil cost, maintenance parts, and labor supervision which, it is easy to recognize, does not cover the entire cost of furnishing power for this service. Depreciation, interest, etc., were not considered as, according to the article, the plant was sold on a time payment basis and the savings between operating costs and the cost of purchased power are supposed to meet the interest, installment payments, etc. This article will be of interest to power engineers faced with similar competitive installations.

"Diesel Engines," by E. J. Tangerman. Power, January, 1935, p. 10. McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York City.

Diesel engines catch the popular fancy due to achievements in trains and railcars. Development most rapid of any prime mover with installations of about 750,000 hp. during the year.

ELECTRIC DRIVE

"Colgate - Palmolive - Peet Co. Extends Power Facilities." Power Plant Engineering, February, 1935, p. 90. Technical Publishing Co., 53 West Jackson Blvd., Chicago, Ill.

Power and steam provided by new 425 lb. plant with one boiler and turbine. Old engine generators kept as standby.

"Refrigeration Machinery, Motor Drives and Control," by R. C. Allen. Power Plant Engineering, February, 1935, p. 117. Technical Publishing Co., 53 West Jackson Blvd., Chicago, Ill.

Motor design has kept pace with refrigeration plant progress.

ELECTRIC MOTORS

"Use of High Voltage Motors," by George H. Hall. Electrical World, March 16, 1935, pp. 26-28. McGraw-Hill Publishing Co., Inc., 330 West 42nd Street, New York City.

The question often arises as to the practicability of connecting customers' motors directly to the primary high voltage circuit, thus eliminating transformer losses. In this article the author discusses a number of factors to be taken into consideration before such a step is undertaken.

ILLUMINATION

"Twice As Much Light," by J. H. Howard. Factory Management & Maintenance, February, 1935, p. 80. McGraw-Hill Publishing Co., Inc., 330 West 42nd Street, New York City.

Stepped up efficiency, reduced eyestrain, yet cost this factory less than 3 cents a square foot to install.

LEATHER TREATING

"Softening Leather by Refrigeration" (Power at Work in Industry.) Electrical World, March 2, 1935, pp. 60-62. McGraw-Hill Publishing Co., Inc., 330 West 42nd Street, New York City.

A new process for softening leather patented in Germany which makes use of refrigeration has come into general use. In the process the damp hides are subjected to a temperature of 6 deg. C. below the freezing point and are thoroughly frozen. The water in the cells crystalizes and expands in freezing separating the hide fibers and loosening them without breaking their interconnection. It is claimed that this process produces the softest possible upholstery or upper leather. The cost of the refrigerator is offset by the fact that stretching machines are no longer required, and in addition, production is considerably speeded up.

POWER SALES

"One Utility Approach to New Business." Electrical World, March 16, 1935, p. 61. McGraw-Hill Publishing Co., Inc., 330 West 42nd Street, New York City.

In a certain territory all isolated plants are carefully rechecked to determine the effect of increased prices brought about by the NRA on total operating costs. Each isolated plant is assigned to a particular division salesman who is responsible for all information concerning this plant. New industries, new locations, new methods, new products, and new outlets are continuously being sought in an effort to increase the power companies' load. Particular stress has been laid on the smaller heating and load building appliances, on modern efficient industrial lighting, and on air conditioning.

"Power Sales Up in Alabama." Electrical World, March 16, 1935, p. 61. McGraw-Hill Publishing Co., Inc., 330 West 42nd Street, New York City.

Power sales of the Alabama Power Company for the first nine months of 1934 have shown a substantial increase over the same period of the last two years being almost double the volume of the preceding years. A total of 11,972 kw. of power load has been signed which is estimated to produce an annual revenue of $262,651.00.

"Tax Free Town" Resumes Taxes

ACCORDING to the Syracuse *Post Standard* of April 7th, the Village of Skaneateles, New York, which has been heralded as a community which has not had a village tax for three years, will have a tax this year. The exact amount of the tax will be determined after a public hearing.

Mr E C Miller, a member of the Skaneateles Village Board, addressing a public meeting in Auburn, New York, on April 5th, blasted the claims of municipal ownership advocates that the Village of Skaneateles had been "tax free" due to the profit from the operations of the electric light plant. According to Mr Miller there were two additional factors which contributed in freeing the village from local taxes. The first consisted of an accumulation of money due to the reduction in village expenses without corresponding reduction in revenue and money appropriated for a specific purpose and not spent. The second factor, and by no means the least important, was the unexpected return of $43,000 to the village from the State of New York in connection with the construction of a new highway through the main street of Skaneateles. The operating costs of the village for the past three years are reported as approximately $15,000 a year.

The Engineer and the Accident Prevention Program

(Continued from page 122)

tention of the workers to rules, to codes, to safe practices. Of course, if he is an able man, he does this in an able way. The design engineer, however, can, by doing his job correctly, support this great effort by living and acting as he thinks, and he will lead his fellows in proportion to the influence that is his by virtue of his personal and technical qualifications.

It has always seemed to me that in the mind of the engineer, above all other class of citizen, must there be full realization of the change in attitude that must of necessity come as a result of our changing social structure. We can no longer think in terms of individual privilege in all things, we must think in terms of the obligation of the individual to the group, for the protection and in the interest, in the last analysis, of each individual. Perhaps that is a bit complex, but look at it this way. As an individual, I am denied the privilege, or right, if you wish, to walk on a railroad right-of-way, because I belong to the public which is prohibited from so doing, all in the interest of safeguarding the life and limb of individuals who might otherwise be injured and who, at the same time, would be endangering the lives of crews and passengers of trains and perhaps creating a situation that might bring property losses to the transportation company. In the spreading of a gospel of understanding and of acceptance of the good intent underlying orders and regulations, the engineer may again serve the construction and operating departments; for he may, by observing all rules and respecting all restrictions, give his endorsement to the principle that in all such matters a conformist is a constructive agent and a builder of better conditions.

The engineer then will be seen to occupy, in this matter of accident prevention, a position that is unique, and his influence will be found to be second only to that of an ardently enthusiastic and capable general superintendent of construction or operation. By virtue of his relation to the job, on which his is regarded by all as the last and the authoritative word technically, his judgments, his opinions, his decisions, are respected in all matters under discussion. By virtue of his relation to the men, which is neither that of an immediate superior, nor that of a safety supervisor, he occupies a position which enables him to exert a powerful influence in the direction in which his associates, the construction superintendent and the safety engineer, are striving. And all of which, if his technical ability and personality are what they should be, will result in his influence being felt in no uncertain degree. He need, then, but set an example which will be found to exert the desired influence among those who are expected to heed the precepts of safety engineer and superintendent.

CONTENTS OF THIS ISSUE

Institute's Convention Again to be Held at Atlantic City 97
More Harm Than Good to Both Consumers and Investors...*By Samuel Ferguson* 99
The Operating Companies and Title II of the Rayburn Bill *By Bernard F. Weadock* 101
Protests Against Rayburn-Wheeler Bill Rise to Extraordinary Proportions 105
Domestic Electric Service in 1934.....*By William M. Carpenter* 109
Operating Committee Meeting 111
J. C. Barnes Wins First Prize for New Orleans Company Advertising Campaign 112
The Alleged "Power Shortage" 113
The Engineer and the Accident Prevention Program.....*By W. R. Smith* 115
Commercial Notes .....*By C. E. Greenwood* 117
Type A Single-Phase Metering Installations.....*By W. C. Wagner* 119
Last Year's Electric Operations 123
Industrial Heating Pointers 125
Power Sales Items 127

CONVENTIONS AND MEETINGS

APRIL

15-16 Prime Movers Committee, William Penn Hotel, Pittsburgh, Pa.
15-16 Hydraulic Power Committee, William Penn Hotel, Pittsburgh, Pa.
16-17 Electrical Equipment Committee, William Penn Hotel, Pittsburgh, Pa.
18 Accident Prevention Committee, William Penn Hotel, Pittsburgh, Pa.
18-19 Transmission and Distribution Committee, William Penn Hotel, Pittsburgh, Pa.
18-19 Southeastern Electric Exchange, Forest Hills Hotel, Augusta, Ga.
24-25 Sales Committee, Edgewater Beach Hotel, Chicago, Ill.
24-26 Missouri Association of Public Utilities, President Hotel, Kansas City, Mo.
25-27 American Physical Society, Washington, D. C.
29-30 Chamber of Commerce of the U. S. A., Washington, D. C.

MAY

1-2 Chamber of Commerce of the U. S. A., Washington, D. C.
13-16 National Fire Protection Association, Atlanta Biltmore Hotel, Atlanta Ga.
19-24 National Electrical Manufacturers Association, The Homestead, Hot Springs, Va.

JUNE

3-6 EDISON ELECTRIC INSTITUTE, Hotel Traymore, Atlantic City, N. J.
17-18 Accounting and Business Practice Section, Northwest Electric Light and Power Association, Portland, Ore.
19-21 The American Society of Mechanical Engineers, Hotel Gibson, Cincinnati, Ohio.
24-26 American Society of Heating and Ventilating Engineers, Toronto, Can.
24-27 National Association of Cost Accountants, Statler Hotel, Boston Mass.
24-28 American Society for Testing Materials, Book Cadillac Hotel, Detroit, Mich.
24-28 American Institute of Electrical Engineers, summer convention, Ithaca, N. Y.
26-28 Canadian Electric Association, Algonquin Hotel, St. Andrews-by-the-Sea, N. B.

SEPTEMBER

18-28 National Electrical and Radio Exposition, Grand Central Palace, New York,

OCTOBER

14-18 National Safety Council, Louisville, Ky.